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TOXEMIAS OF PREGNANCY*

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When we consider that 29 per cent of our stillbirths and macerates are the result of toxemia and that 27 per cent or more of the women who die during pregnancy or in childbed die from toxemia, convulsions or their sequella; it is evident that there is no uniform teaching on this subject, and that too much surgery is being done on a medically sick patient. It is, therefore, my purpose to consider the known clinical facts in hyperemesis, pre-eclampsia in contra distinction to pregnancy occurring in the nephritic woman and eclampsia with its convulsive explosions, in order that the practitioner may better understand the present status of this baffling subject. It may be said that pregnancy is the great efficiency test of the workings of the maternal organism; for the fetus and the uterus in their growth call for such adaptative changes in all the important organs of the mother, that unless there is perfect and harmonious efficiency on the part of all of the organs called upon in the development, the load cannot be carried. The pituitary, thyroid and parathyroids become activated, ovulation ceases and more work is demanded by the liver, kidneys. lungs and heart. Therefore, it is easy to deduce that incompetence on the part of any organ must shift the load to the others with resulting defect in the body metabolism.

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The toxemias of pregnancy present the most striking examples of maternal maladaptation to the needs of the fetus and fetal growth. The very fact that nausea and vomiting of greater or less degree occur in more than 50 per cent of pregnant women may be considered as an inevitable evidence that there is a temporary disturbance of the physiologic balance. This has been accounted for by the relative carbohydrate deficiency due to the unexpected demand for glycogen on the part of the fetus, and to the actual deficiency occasioned by the nausea, vomiting and the consequent lessened intake.

With these facts demonstrated it takes but little imagination to appreciate that by lack of care, marital indiscretions, improper hygiene and dietetics, this vomiting which is so common in the early months may be aggravated to a degree which will take large quantities of fluid out of the body tissues resulting in dehydration. The actual fluid loss from emesis in patients who have had no fluid intake by os, varies between 1000 and 2000 cc. per diem. Such a fluid loss repeated day after day, quickly dehydrates the woman and produces the clinical picture of dehydration which is so familiar to you all. The rapid emaciation, the dry coated tongue, dry cracked lips, increasing pulse rate, diminished urinary output and lowered blood pressure. Rapid emaciation is farther augmented by starvation, and we find the following clinical phenomena result: The blood pressure is lowered, the pulse gradually increases in rapidity, the urinary output is diminished;

while there is a concentration of the body fluids and an increase in the carbohydrate deficiency as more and more glycogen is abstracted from the liver, in order to carry on life. Together with these signs the leukocyte count is usually diminished and an icteric hue tinges the conjunctiva.

It may, therefore, be deduced that the pathology found in the liver and kidneys is a result of a retention of toxic products consequent upon the dehydration and the glycogen deficiency. Certainly the final pathology in the liver is identical with that found in patients dying from starvation. This deduction is supported by the fact of the rapid subsidence of hepatic and renal symptoms when the uterus is emptied or when diuresis is produced.

Mundell studied the blood in a series of 52 normal pregnant women at the different months of pregnancy beginning with the second and ending with the ninth. This study shows conclusively that there is very little actual change in the blood chemistry except in the nonprotein nitrogen and uric acid contents. The normal blood seldom contains more than 3 mg. of uric acid to 100 cubic cc; while the nonprotein nitrogen rarely exceeds 30 mg. In excessive vomiting dehydration and rapid emaciation, the uric acid reaction is always slightly increased. Another significant point is, that the blood sugar maintains its normal ratio in the pregnant woman until about the end of the third month or about the time when placentation takes place, at which period we note a sharp drop in the sugar content; while toward the end of the fourth month and the beginning of the fifth the ratio seems to be re-established on a normal basis. This points to the disturbance in the carbohydrate fat ratio as the basic factor in this disease. It is on the acceptance of these facts that the adoption of the suggestions of Hardne and Titus have proved their clinical value. The intravenous use of large quantities of a properly prepared glucose solution replaces the sugar deficiency and allows the proper functioning of the liver to carry on.

Roger, Davis and Whipple have shown that starved animals are especially susceptible to liver injury; while by increasing the carbohydrate intake the liver resistance is increased.

At the research laboratory of the University of Minnesota, liver tolerance has been most exhaustively studied. It has been found that it is possible to remove four of the seven lobes of a dog's liver, and by giving such an animal daily injections of a glucose solution his health will be in no way impaired. On the other hand, if no glucose is given, his susceptibility to injury, dietary indiscretions or exertion are very manifest.

In mild cases of early vomiting the patient should be impressed with the necessity of revamping her mode of life; her dietetics and her hygiene. Perhaps the most important of these is her sex hygiene —it is imperative that marital abstinence *be insisted upon;* that malpositions of the *pelvic organs be corrected;* that the constipation be relieved—and in addition to these fundamentals, that the amount of carbohydrate as well as fluid intake be increased to the point of greatest tolerance. The copious ingestion of water should be encouraged—usually in the form of a bland or alkaline water (Poland, Kalax or Celestin vichy.) *at least two quarts of water daily must be taken.* To meet the carbohydrate deficiency we insist upon an increase intake of carbohydrates in the form of cereals, fruit, fruit juices with sugar, puddings, chocolate or candy.

These general principles should be supplemented by rest in bed after meals, and the internal administration of small doses of thyroid extract. Should the vomiting persist and the patient lose weight, rest in bed *with absolute isolation is to be insisted* on; and the fluid loss made up by the hypodermoclysis, enteroclysis and the intravenous injection of glucose solutions

amounting to 1000 cc. daily of 10 per cent solution until diuresis is produced.

In 1924 and 1925, Thalhimer extended his treatment of post-operative nondiabetic acidosis to include cases of toxic vomiting of pregnancy. Briefly, the method consisted in the intravenous administration of about 1000 cc. of warm 10 per cent glucose solution at the rate of from 200 to 300 cc. an hour. In addition, fifteen minutes after the injection has been begun, 10 insulin units are given hypodermically. More insulin is given at intervals of an hour, until 30 units to the thousand cubic centimeters of glucose solution has been given.

Although Thalhimer gave due credit to Titus, Hoffman and Givens, and to Duncan and Harding, who had administrated glucose alone in cases of this sort, his method of combining insulin with glucose has not given better results than did glucose alone. If this treatment is successful; the pulse will become slower and fuller, the blood pressure will rise, the urinary output will be increased, and the vomiting will diminish or cease altogether.

When glucose alone or in combination with insulin fails to produce this improvement, I have employed transfusions of 300 cc. human blood by the direct method to which is added 500 cc. of physiologic sodium chloride solution. The success of these procedures has been so satisfactory that I have not had to empty the uterus for vomiting in a period of nearly seven years. It must, however, be impressed on the attendant that if, under this plan of treatment properly carried out for a period of a week, diuresis is not produced and the vomiting continues, the uterus should be emptied. As soon as vomiting ceases, the patient should be given solid food with a high carbohydrate content. Should no improvement take place after transfusion, the uterus should be emptied under morphine-scopolamine narcosis.

PRE-ECLAMPTIC TOXEMIAS.

The situation in pre-eclamptic toxemias is not the same as in pernicious vomiting, except that they both occur in pregnant women, and that in fatal cases the liver is always seriously involved.

In the study by Herrick at the Sloan Hospital, where every toxemia of the latter months is studied by the internist as well as by the biochemist and the obstetrician, they have come to the conclusion that the woman who develops a pre-eclamptic toxemia or an eclampsia is the woman who starts on her pregnancy with defective emunctories or an unbalanced endocrine system. It is the result of a dysfunction and improper correlation of the eliminative system and endocrine control in the individual woman. My own study tends to confirm this theory, which has a definite clinical backing. Therefore, the real clinical questions in toxemia are what physical type of woman breaks down under the strain of pregnancy. What pathological changes does she show before and during pregnancy, and what pathology remains after so-called recovery? Women with persistent systolic pressures of 150 and diastolic pressures above 100 at the beginning of pregnancy are not likely to go through pregnancy successfully. A pressure of 140 may be considered hypertension in pregnancy, for the normal pregnant women has a characteristic arterial hypotension. The late toxemias of pregnancy represent failure of a defective maternal cardiovascular renal system to adapt itself to the strain of child bearing. This is subsequently shown by cardio-vascular renal changes evidenced by albuminuria, nitrogen (non-protein) retention.

I feel certain that eclampsia is not due to any specialized toxin or toxins elaborated by the growing fetus or its appendages combined with the failure on the part of the mother to develop an antitoxin, but rather to the overload suddenly placed on the maternal organism; for the pregnant woman shows a condition of rapid growth and a rapid increase in weight superimposed on

an adult organism that has ceased to grow. It is only natural, therefore, that metabolic strains are set up in the mother to meet the demands of the fetus. This results in a disturbance of the metabolic balance, which in turn affects hepatic and kidney function; for it is well known that eclamptic disturbances which characterize the latter half of pregnancy occur at a period of rapid fetal growth which needs an increased quantity of glucose to maintain it. This in a way confirms the low sugar content of the blood in pregnant women, as well as the increase in the uric acid content of the latter weeks.

Repeated studies of the blood chemistry in pre-eclamptic toxemias show nothing that is significant or characteristic except that when the blood is found to have a decided nitrogen retention, either in the form of nonprotein nitrogen or in uric acid—it may be assumed that nephritis is the predominating factor in the particular toxemia.

I had expected to find that the basal metabolism rate would be materially changed in the pregnant woman, and be available as a diagnositic sign of some value in the pre-eclamptic toxemias; but studies of the readings at different periods of pregnancy has proved that the woman who is functionally fully equipped and healthly in the early months has practically no change in her metabolic readings, and that there is slight though definite elevation of the basal rate in the latter half, returning to the normal after a few days of the puerperium.

In the pre-eclamptic state the readings are slightly higher than normal; this, howevr, is demonstrated only in the severe conditions. There is little or no difference in the patients with and without a pre-existing kidney lesion, so that antepartum differentiation cannot be made by this test. However, in the nephritic type the reading is apt to remain higher for some time after delivery; which in a way coincides with the blood pressure readings; therefore it may be concluded that neither blood chemistry nor metabolic rate throws much light on the etiology or prognosis. Furthermore, the clinical manifestations, those that may observe by any keen practitioner, are of greater significance.

DIAGNOSIS.

The pre-eclamptic toxemias are usually considered under:

1. The hepatic type, which is commonly of sudden development with a nephrosis, as the kidney lesion without any pre-existing history of renal disease.

2. The renal type, in which nephritis is a contributing etiologic factor. The clinical distinction between these two types in antepartum toxemia is difficult to make, though in the former there is a previous history of renal disease, while in the latter there is always some clinical evidence of pre-existing kidney lesion. However, after the labor is terminated, the hepatic type is shown by the relatively quick return of the blood pressure and kidney function to normal; while in the renal type it may take months to clear the urine of albumin and casts, and the blood pressure never ranges below 140.

The earliest evidences of toxemia are:

1. A rise in the systolic blood pressure.

2. The appearance of an albuminuria coincident with or appearing soon after the occurrence of hypertension.

3. Diminished urinary output — the quantity of urine eliminated falling below 1000 cc.

4. An increase in the body weight beyond the normal 25 pounds (11 kg.).

5. The appearance of edema in the face, hands and feet.

6. Constipation associated with "heartburn" and epigastric distress.

7. Frontal headache.

8. Eye symptoms, ranging from spots before the eyes to amaurosis.

BLOOD PRESSURE.

The pregnant woman whose kidneys are healthy at the time of conception carries a hypotension seldom rising above 120. Progressive readings above this point demand watching. Increasing hypertension during the course of pregnancy at any age points toward the onset of toxic symptoms. Rise in pressure usually precedes the appearance of albumin by days or weeks, unless there is a pre-existing kidney lesion. Coincident with the occurrence of albumin there may be a diminution in the urinary output with or without increased concentration.

WEIGHT.

The pregnant woman normally increases her weight by about 20 to 25 pounds (9 to 11 kg.) in the course of pregnancy. The greater part of this increase takes place during the last four months. Rapid increase is always dangerous—less so when associated with edema, for edema seems to be a salutary and conservative process which takes the toxins out of the blood and deposits them in the tissues. Eclamptic explosions are less liable to occur when there is edema, especially when the edema forms slowly, than when it is of rapid appearance.

HEADACHES.

Frontal headache is one of the later manifestations of toxemia, sometimes the earliest forerunner of a convulsion. Headaches should always be inquired into. They are more common in the nephritic type. Gastric acidity with pain or burning of the epigastrium is another evidence of toxemina which gives warning of impending danger.

EYE.

Eye symptoms are common in the nephritic type, the fundal and retinal changes having the same appearance as are found in glomerular nephritis. They are usually absent in the fulminating type except for increased tortuosity, high arterial light reflex and increased spasticity. Occasionally exudate may be present.

The treatment of the pre-eclamptic state and of eclampsia is essentially medical. The obstetric problem comes in for consideration only when labor is established by the convulsive siezures. Notwithstanding the fact that convulsions cease in 52 per cent of the cases when the uterus is empty, we are not justified by the results in any extensive series of clinical observations in making delivery the first consideration in view of the poor surgical risk. Naturally, the treatment of the latter month toxemias resolves itself into:

1. Prevention. One of the greatest strides in preventive medicine has been the antepartum care given to the pregnant woman. It has resulted, in many clinics, in the passing of eclampsia.

2. The control of the convulsion.

3. The management of labor in the presence of convulsions when labor has started.

The pre-eclamptic toxic patient should be in bed. She should have her nitrogenous intake limited to just enough to sustain life; milk and fruit juices with sugar make up the foundation of her diet. Stimulation of her emunctories should be done by producing diuresis. This may be done with water and the intravenous use of glucose solutions, except in the cases of edema, when the intake of fluids should be restricted and diuresis stimulated by lumbar cupping, ammonium chloride and calcium chloride. The skin must always be kept active. This effect may be secured by having the woman rest between blankets or with the electric baker. To favor surface relaxation the nitrates will add to its efficiency. When no improvement is shown, pregnancy must be terminated by the existing obstetric condition, always keeping in mind that the toxic patient is a poor surgical risk, bearing anesthesia poorly, liable to shock, and more susceptible to infection than her better equipped sister. Haste and trauma must be avoided. In the presence of convulsions the indications are never surgical. With the appearance

of the first convulsion, the woman should be given (hypodermically) one-fourth grain (16 mg.) of morphine sulphate; placed in bed in the Trendelenburg posture, and turned on the side to allow the mucus to drool from the mouth. The tongue must be protected by a "gag"; the bladder is emptied by catheterization. If the pressure is 150 or more, 1000 cc. of blood should be withdrawn. This may be replaced by 500 cc. of a 10 per cent glucose solution. The morphine is repeated in an hour—and nothing else is done.

Unless the convulsions recur and the supervening coma increases to a degree that the patient remains comatose between convulsions, this condition is an indication for the intravenous use of magnesium sulphate in quantities of 100 cc. of a 25 per cent solution which has had a most kindly effect, diminishing the cerebral edema and controlling the occurrence of subsequent convulsions.

The management of labor in the presence of eclamptic convulsions is based on the three principles of: (1) Avoiding trauma; (2) preventing infection, and (3) diminishing the shock—for the eclamptic patient is a very poor surgical risk.

My plan has been to disregard the labor until complete dilatation of the cervix is obtained when, if the head is engaged and at the spines, delivery may be expedited by the use of low forceps under light oxygen-ether narcosis added to the morphin analgesia.

Section has been limited to those cases in which there was a definite obstetric indication and not employed as a routine for rapid delivery. My experience shows that prevention is the keynote of success; the toxic patient needs active treatment with the first appearance of hypertension; convulsions may be prevented by induction of labor when medical means fail to reduce tension and produce diuresis, and the treatment of eclampsia is essentially medical, and surgical delivery has only a limited field.

DISCUSSION.

Dr. George Gray Ward (New York City): I do not rise to discuss "The Toxemias of Pregnancy", so fully and interestingly covered by Dr. Polak, but to voice my appreciation and great pleasure in having had the privilege of listening to his discourse on this complicated subject. Those who have listened to him tonight must have been impressed, as I was, with the fact that in obstetrical work systematic training and a vast amount of knowledge are required to do the best for this type of patient.

I thank Dr. Polak.

Dr. E. L. King: Particularly appropriate at this time is that very trite remark with which you are all familiar, that "the subject has been so fully covered that I can add but little to what has already been said."

In the work that we have been doing at Charity Hospital where we get a great many of these toxemias, we have been working along the same general lines as outlined by Dr. Polak and our results have been somewhat confermable to his. We have long reached the conclusion, that particularly in eclampsia, there is no surgical indication, but that it is a medical condition.

I employ Stroganoff's method which consists essentially in the use of morphin and chloral, and in controlling the convulsions with chloroform; this as a rule is not followed by others because chloroform damages the liver and there is already liver damage present. The use of oxygen and gas certainly seems to be preferred. Dr. Polak did not mention ether. Personally I do not believe that ether would be indicated, particularly in view of a disastrous experience I had recently. Because she was having convulsions my patient was given ether. Thirty-six hours later she died of edema of the lungs. Now she might have developed this condition afterwards without the ether, but under the circumstances it was hard to dissociate the ether from the subsequent acute edema of the lungs, the cause of death.

I can only second Dr. Polak's statement that after a patient recovers from a convulsion she should be delivered. Stroganoff has reported some cases where he carried them over for weeks after the convulsions had been controlled and they have gone on through to normal delivery. But the toxemia persists, the cause is there and we are subjecting that patient, first to the recurrence of eclampsia, second to the risk of permanent renal damage, and third we are running the hazard of intrauterine death of her baby from toxemia, so there is little to gain by carrying on this pregnancy, but a great deal to lose.

Another point about toxemias in general, brought out by several studies, is that a considerable amount of renal damage often attaches to the woman who is purely a pre-eclamptic, as well as to the eclamptic. In fact, when pre-eclamptics are allowed to drag along because their condition has improved slightly, just enough to make us feel a little easy and we carry these pregnancies on for weeks, it has been found on investigation a year or two later, that these patients have a pretty high percentage of pre-manent renal damage. The percentage in this class is much higher than where the pregnancy is interrupted promptly; it is still higher than in cases of frank eclampsia, but even in cases of frank eclampsia it is found renal damage is much more frequent than we formerly thought. I believe that in pre-eclamptic toxemia if we do not get prompt and marked improvement there is nothing to be gained by carrying on the pregnancy. In nephritic toxemia we can be more conservative because we are not running so great a risk of eclampsia. The treatment of eclampsia is medical first and then emptying the uterus 24 to 36 hours after the convulsion is controlled.

Dr. John O. Polak (Closing): The point brought out by Dr. King is something that should be emphasized. We had always supposed that in cases of pre-eclampsia that the kidney lesion was a nephrosis and that there was little or no permanent kidney damage. In following up these cases (as we are all trying to follow them up), it is rather remarkable to find that after two and three years so many of them have defective kidneys. While they are not liable to to have a recurrence of the eclampsia should they again become pregnant, yet the kidney function is always somewhat imparied if we let them carry the pegnancy along in the interest of the child. We have to do this sort of thing, yet I warn you again trying to carry these patients too far along with a pre-eclamptic toxemia. Another thing, there is no surgical treatment to eclampsia until after the convulsion has been absolutely controlled and the patient is well.

Now, with regard to anesthetics. They stand all sorts of anesthetics badly and this is the place for local, spinal, and morphin.

It does not take a man very long to learn how to use these methods; they are safe and do not change the carbon dioxide combining point nor sugar content of the blood, and all anesthetics have that effect when given by inhalation. Chloroform is the most dangerous, gas perhaps the least dangerous, but gas is not safe in these cases.

ACUTE CONDITIONS IN THE LOWER ABDOMEN OF THE FEMALE.*

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1. The genital tract in the female is a hollow cylinder, bifurcate above, which communicates directly between the skin surface and the peritoneal cavity. A direct channel, or avenue of communication between a contaminated skin surface and this mesothellial space!—Victor Bonny.

And this genital tract is subject to many vicissitudes. There are the traumata of menstruation, of child-birth, and abortion; and the dangers associate with venereal disease. It is an imperfect world. Hence in the female the frequency of acute infections of the lower abdomen.

2. The peritoneal cavity is one of the three large enclosed chambers of the body —it is the largest of the three, the largest lymphatic space. Its absorptive surface is immense, compared either with the pleura or the sub-dural space. Hence the danger of an acute infection of this large space. The peritoneal cavity—an organismal Valhalla—a perfect incubation chamber.

These acute conditions are sometimes grouped together under the term, "The Acute Abdomen," "The Emergency Abdomen." The point of the emergency concerns both the patient and the surgeon, and any given individual has only one abdomen. To open or not to open—that is the question, a decision often-times of very grave importance.

I need not tell you that the opening of the abdomen should never be lightly or carelessly undertaken. I object to the term of "giving the patient the benefit of an exploratory." For if too often done this may be interpreted, "condemning the patient to an added injury." In surgery we must remember the three "Cs"—caution, care, as well as cutting. You also will agree that

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before any abdominal operation is undertaken, a vaginal examination, a rectal examination, or both, should invariably be made. Plea for mid-line incision in interval cases.

In general terms, these acute conditions may be grouped as follows:

(1) Hemorrhage, a concealed hemorrage.

(2) Acute infections, usually of the uterus, the Fallopian tubes or the appendix.

(3) Perforation of the bowel or other hollow viscus—perforation or rupture.

(4) An acute bowel obstruction.

(5) Strangulation of any organ or neoplasm.

(6) The passage of an ureteral stone.

(7) A uterine abortion, spasmodic dysmenorrhea, or even a bladder retention.

For the gynecologist the most common of these are, a ruptured ectopic pregnancy, an acute appendicitis, or salpingitis, a uterine infection, strangulation, an ovarian cyst or uterine fibroid.

Speaking in a general way for all these conditions, some of them are at once recognizable—he who runs may read; while others require a most painstaking differentiation.

May I first make two pleas of a preliminary character. The first concerns the wisdom of a careful case-history, for in many of these conditions the previous history, or the story of the onset, may afford the clue. Sir James Mackenzie pointed out that in difficult cases, the diagnosis frequently depends more upon an exact history than even upon a careful, exact examination. My second plea is always to pass a catheter, and to examine the resulting urine.

I shall now discuss in a general way the various signs and symptoms of these acute conditions.

Pain is always the outstanding symptom. —It may well be defined as Nature's expostulation to an injury, and its function is a protective one. La Rochefoucauld has told us that pain is the greatest liar in the world, but it is wise not always to believe this. At times it is a liar, and so for the matter of that are all men, and a few women, but I believe it is wise to take the following advice. "Never open the abdomen for pain only," for pain only and with no accompanying signs or symptoms.

The most important sign, perhaps, is the face—the abdominal face—the facial expression, and this never lies. So often it is the anxious peritoneal face, apprehensive. In hemorrhage it is pallid ,often waxy, and the muco-cutaneous line of the lip is unduly sharp and pronounced. There is the grey ashen face of shock, and the flushed, or cyanotic face, of a severe toxemia. The severity of the lesion can often in this way be immediately adjudged.

And there is the attitude of the patient, her decubitis, and her mobility.

If the lesion be acute, and intra-peritoneal, the patient lies invariably upon her back, and with her knees flexed. Any movement is a torture. On the other hand, if the patient moves readily, and turns easily on her side, there is no grave lesion within the abdomen. I have often found this test of asking the patient to turn over on her side of great service.

So far you will observe I have not mentioned either the temperature or the pulse-rate. I shall refer to them later in their special place.

Let us now consider the three commonest of these lower abdominal conditions. These are, you remember, hemorrhage, acute infection of appendix, or Fallopian tube, and a strangulation or thrombosis of a pelvic organ or neoplasm.

(1) The first of these is hemorrhage. The common site, of course, is a ruptured tubal pregnancy. A severe hemorrhage may arise, however, from other situations;

for example, from a ruptured Graefian follicle. (Three years ago, Primrose, of Toronto, reported six such cases. I have met one in my own practice and there was a large loss of blood.) Again, a varicocele may rupture, and a uterus ruptured during labour, or perforated even by a sound or a curette, may lead to a severe intra-peritoneal hemorrhage. The history here is all important.

But the usual cases are the ectopics. As you know, the history of the pregnancy, the amenorrhea is often indefinite. Rupture usually between the 7th and the 12th weeks, and this rupture may be large or small. The dangerous situations are the isthmus and the cornu of the uterus. If large, the hemorrhage is usually severe, the cataclysmic case with the pallor, sub-normal temperature, the rapid and thready pulse, air-hunger, cold and clammy extremities. The abdomen is tumid and tender, frequently tympanitic, for the bowel floats (blood has a high specific gravity.) The pouch of Douglas may be full and depressed, and a feeling of crepitation as the finger breaks the blood-clot may be present. There is frequently the history of the dagger-like thrust of pain, with immediate faintness or collapse. A uterine trickle of blood is often manifest, together with rectal tenesmus, and some bladder strangury. In these severe cases, the diagnosis is easy, and does not require the taking of a hemoglobin index. Open the abdomen at once and give a venous transfusion—citrated blood or a glucose saline.

It is well to remember that if such a case survive and be not seen till the 4th or 5th day the patient may present all the signs and symptoms of a widespread peritonitis, namely, fever, a rapid pulse, a distended abdomen with paralytic ileus, a regurgitant vomiting with a marked leukocytosis—the picture of late bowel obstruction.

In a so-called chronic case—the "leakers" —while the diagnosis is less urgent, it is sometimes more difficult to make.

There is the history—repeated attacks of sharp, lancinating pain in the lower abdomen, an interval of 24, 48 hours, or even some days between them; slight uterine hemorrhage, no marked fever, or great disturbance of pulse-rate; a lateral mass on one or other side of the uterus, increasing rapidly in size. Mark such a case.

If a decidual cast is shed from the uterus —this occurs in only about 20 per cent of the cases—the diagnosis is clear.

There is in these cases a degree of anemia; there is often a marked leukocytosis (De Quervain contends that a leukocytosis of twenty-thousand, where signs are slight, points to a hemorrhage rather than to an inflammation.)

A hemoglobin index is of small value, you remember. Two years ago the hope was expressed that a low and falling index would reveal a concealed hemorrhage. Unfortunately this is not so.

We rely in these cases upon the history —the recurrent attacks of pain—the uterine bleeding and mass, at first lateral to the uterus, which increases rapidly in size.

It is always well to bear in mind, that—if in doubt, an exploratory colpotomy is the indication, and at once settles the matter. If blood is found, open the abdomen from above and remove the tubal sac.

(2) The second common condition is an acute infection—an infection of either the vermiform appendix, or the Fallopian tube. The distinction between these two infections is an all-important one to make, for an inflamed appendix should be at once removed, certainly within the first 24 hours, while to open the abdomen for an acute salpingitis is nothing short of disaster.

The inflamed appendix we all know, with its more or less definite syndrome, outlined first by Reginald Fitz, and its surgical treatment indicated by McBurney of New York. Professor Wilkie of Edinburgh emphasizes an important pathological and clinical distinction. He says "there are two

main types of acute appendicitis." (a) the one infective, an organismal invasion of the lymphoid tissue, the inflammatory type. Here there is pain, more or less continuous, but not severe, fever, increased pulse-rate, localized tenderness and a marked leukocytosis; and (b) the obstructive type, fecal concertions, often present, blocking of the circulation, and sudden gangrene, and perforation. Here the pain is intense and spasmodic, the fever is slight, the pulse is often rapid, the abdominal facies, and no great increase in leukocyte count."

These are his two main divisions, and I think they are well founded.

The common infection of the Fallopian tube we are all familiar with. It is really a mixed infection, an acute exacerbation of a chronic condition. The chronic infection is a gonorrhoeal one, rarely tuberculosis, and the acute maleficent synurgism is frequently due to the colon bacillus.

It is the distinction between these two acute conditions, the one of the vermiform appendix, and the other of the Fallopian tube, that sometimes taxes to the utmost our clinical acumen.

How shall we proceed to such a distinction? It is, I admit, an old story, but one that in our daily practice is ever new.

In a general way it may be said that in acute salpingitis the patient does not appear so ill; the temperature is often high, it is true, usually higher than an appendicitis, but the pulse-rate is not correspondingly disturbed. The face is often flushed, but not to the same degree anxious or apprehensive. The function is not so greatly disturbed, nausea and vomiting are not a feature, though there may be considerable distention. Abdominal tenderness and rigidity more diffuse and wide-spread.

All this in a general way, the general rule, if you like, where there are bound to be exceptions.

The history of the case, the history of an onset, or of previous attacks, a previous complicated puerperium, a one-child sterility, with depraved menstrual habit, may afford a clue.

And then in our examination we always look for signs of a gonorrhoeal infection. As I have said, it is an imperfect world. First, the signs at the vulva-vaginal outlet; the chronic urethritis, with the pouting and edematous tubulus of Skene. The gonorrhoeica maculae, these sinister patches at the opening of the Bartholinian duct;—these are all signs that a gonorrhoeal infection has passed that way.

If the infection be a Noeggerath's infection—a chronic gleet in the male—there will only be the chronic cervical catarrh, and the immobility of the uterus—the uterus fixed in starch, as it were, and often with no definite appendage mass. Yet, at this time, the appendages are slightly enlarged, and very sensitive; and the mere movement of the cervix uteri elicits severe pain.

With such a finding, the diagnosis is, an acute exacerbation of a chronic salpingitis, with a spreading peritonitis, and the indication is—Above All Things, Do Not Operate.

The situation in these cases was well summed up some years ago by one of our able Southern surgeons, when he said: "In a gonorrhoeal salpingitis, never operate in the acute stage; wait till the cold stage, and clear them out." Never operate till you are compelled.

In contradistinction to this clinical picture I think it wise for us to keep in mind a typical attack of appendicitis. The history helps us here. There may have been previous attacks, but—

The pain is first felt about the umbilicus or in the epigastric region; but soon determines itself in the right lower quadrant.

There is anorexia, or nausea, or even vomiting. There is tenderness over McBurney's point, which we remember is the base of the mesentery of the appendix—a lymphangitis.

Some muscular spasm or rigidity of the right rectus or oblique muscles.

Fever or quickened pulse-rate, often not specially pronounced.

A moderate leukocytosis—ten to twelve thousand, with polymorphs predominating. If the inflamed appendix be near the brim of the pelvis, a vaginal or a rectal examination shows a marked tenderness in the neighborhood of the right sacro-iliac joint.

Such is a typical clinical picture of a catarrhal appendicitis. We can see at once how it differs from an acute salpingitis. In doubt between the two—watch and wait—hour by hour—not day by day.

(3) A thrombosis in organ or neoplasm. Here the lesion is a definite thrombosis, or a twist in a pedicle. The common neoplasms that suffer this pathology are ovarian cysts of medium size, or a fibromyomata, of the uterus, pediculated or intramural.

Frequently the patient has been aware of the presence of the neoplasm.

The pain is severe and colic-like, short in duration, and the tenderness is at first localised to the tumor-surface; there is small disturbance of temperature or pulse-rate.

A careful examination discovers the neoplasm. If the thrombosis be extensive, or the strangulation severe, and the patient be seen late, there are all the signs of a super-added peritonitis, the result of a colon infection.

These three conditions mark the common acute lesions of the lower abdomen.

May I add here a word of warning in respect of pneumonia. A pneumococcic infection, which may spread below the diaphragm, and simulate even an appendicitis. My warning consists in this—a careful history of the onset. If a rigor has occurred, a chill, it is probably not appendicitis. In a series of 85 cases of appendicitis, in a service in the Royal Victorian Hospital, a chill was recorded but three times; so, if there is a chill at the onset, watch the alae nasi (count the respirations), think of pneumonia, and make a leukocyte count. If the leukocyte be over 15,000 in the first 24 hours, it is likely to be pneumonia and not appendicitis.

Pneumococcic peritonitis: first menstruation; history must help us here and a widespread lesion from the first—and drainage was in two cases the salvation.

A word or two concerning bowel obstruction—an obstruction of the lower bowel. I need not remind you to examine all hernial orifices. An intussusception is common only in the young or adolescent, and soon gives rise to a typical ilio-caecal tumor, and the characteristic bloody mucus bowel discharge.

A volvulus occurs rather in the old, a rare left-sided lesion, which can usually be felt by bi-manual examination.

These obstruction-cases occasion colic, with quiet intervals; ladder-pattern constipation of course, and later, the anti-peristalsis may result in vomiting.

A diverticulitis occurs usually in the pelvic or iliac colon, and a diarrhea is a frequent concomitant—diarrhea and fever.

A stone in the ureter, or in the pelvis of the kidney may cause abdominal distention and vomiting, and not a few abdomens have been mistakenly violated.

The onset of the pain, its distribution unto the urethra or down the leg, a frequent micturition, and blood in the urine may possibly identify it. If in doubt, a roentgenogram picture should at once be taken.

A good surgeon must first be a good physician. A mind broadly trained and the hand narrowly.

The function of the good surgeon is to diminish surgery in the world today.

DISCUSSION.

Dr. Hermann Boldt (New York City): Dr. Chipman, in his inimitable and learned language has fully covered his subject and it is indeed with great pleasure that I have listened to his remarks.

There are a few points to which I would like to call attention. One is in connection with tubal gestation, or tubal rupture, and that is the sensitiveness and tenderness experienced by the patient upon moving the vaginal portion of the cervix anteriorly and posteriorly. Since my attention was called before operations many years ago to pain in that location when doing that, I have not found a single instance where it was present without tubal pregnancy, other symptoms of faulty impregnation also being present.

The next feature which I lay emphasis upon is care to avoid operating in instances of acute salpingitis. This lesson I learned more than forty years ago, having operated on a patient and lost her. Since that time I have stopped it and I can only reiterate what Professor Chipman has said: "Be careful—do not operate on these cases."

Another feature I would stress in tubal disease is, that is if the patients will hold out long enough on the rest plan of treatment, providing the infection is due to the gonococcus, the majority will get well. But we must remember that there are women who cannot undergo that long, tedious waiting. They have to earn a livelihood for themselves and in that class of patient an exception should be made if they do not get better, or if there is constant recurrence. But I do say: never operate during the acute stage—always wait for subsidence.

These are the features to which I would like to call attention. I thank you.

Dr. C. Jeff Miller (New Orleans): The whole point of Dr. Chipman's paper is that diagnosis is a matter of the clinical picture rather than of laboratory findings. The tendency today is to make them the basis of diagnosis, and it is a dangerous and a wrong tendency. The patient is more important than the blood count, the history, properly interpreted, plus the physical examination, is the key to the condition, and the emphasis should be put where it belongs.

I am particularly interested in Dr. Chipman's remarks on acute salpingitis, for they echo my own opinion, an opinion upon which my entire practice in this disease has been based since Frank Simpson, twenty years ago, delivered his memorable address on the treatment of pelvic infections. These patients ought to be let alone, they do not die under expectant treatment, though many do die if immediate surgery is done. The idea that the condition is a surgical emergency is all wrong. Pus tubes do not rupture. In many years of practice I have seen that contingency occur only twice. Sporadically, here and there, we find men arguing in favor of immediate operation, but in the leading clinics of the world we find that acute salpingitis was long ago taken out of the realm of surgical emergencies. This is particularly true in those clinics where a follow-up service is properly organized and the real results of expectant treatment may be seen. Thus in Holtz' clinic in Scandinavia, where the follow-up system is perhaps the best in the world, a recent report of more than a thousand cases treated expectantly shows 82 per cent of clinical and 12 per cent of functional cures, and only 2 per cent of total failures. No clinic where immediate surgery is the rule can show such results as this.

Tubal infections promptly subside under rest treatment and auto-sterilization takes place. This is especially true of specific infections. Mixed infections, on the other hand, are prone to be long drawn out affairs, and the rest which is essential tries both patient and physician. It is important to remember, too, that a patient who is running a temperature of 99.5° or even 99° is not a thoroughly cooled patient; her rest must be prolonged until even this slight fever has disappeared for two or three weeks and preferably longer. The patient, given time, will always develop her own immunity, and when operation is necessary, if it ever is, it will be a simpler and safer affair than if it had been done in the presence of active bacteria and inflamed structures.

Another point which should be specially stressed is the prophylactic measure of rest in bed after there has been an infection of the lower genital tract. This is particularly important during the menstrual period, when extension upward is the rule if the patient is at all active. The proper utilization of this simple measure would prevent many trying cases of salpingitis.

Finally, colpotomy, as Dr. Chipman has properly emphasized, is a decidedly valuable measure in evacuating localized pus collections which point in the cul-de-sac. Except for this, however, acute pelvic conditions should be let severely alone, not for days, but for weeks and months. Operation during the acute stage may be a brilliant surgical feat, the technique may be excellent and the immediate results all that is desired, but the end results are what our book-keeping must be based on, and the last state of that patient is often worse than her first.

Dr. R. Matas: I did not expect to be called upon to take part in this evening's discussions, but I am glad of the opportunity afforded by the courtesy of the Chair to at least say how much I have enjoyed the addresses delivered by the distinguished speakers of the evening. Limiting myself to Dr. Chipman's address, since the discussion of Dr. Polak's paper has been closed,

I will state that this is not the first time that I have had occasion to express my appreciation of Dr. Chipman's merits. It was my good fortune to have been associated with him on the Board of Regents of the American Colleges of Surgeons for a number of years and later as my successor in the Presidency of the College at Montreal, in 1926. Throughout these relations I have had ample opportunities to admire his personal qualities as a leader in the profession and as public speaker, which we have enjoyed so much tonight. Dr. Chipman is as much a part of the profession of the United States as he is of Canada and no one is better fitted to symbolize through his genial personality the cordiality of the relations and the unity of purpose that bind us to our Canadian brethern. The ties that bind the people of this country to Canada are particularly strong in Louisiana where the very foundation of its history were laid in Canada and the recollection of these historic associations gives added zest to the pleasure of Dr. Chipman's visit.

In his discussion of the acute conditions that affect the female pelvis, Dr. Chipman has covered a large field bristling with problems that often tax the diagnostic skill and the best judgment of the practitioner. Throughout the discussion he has revealed himself not only a most experienced and expert clinician but a wise and discriminating surgeon who knows how to subordinate his operative skill to his knowledge of the proper moment for its application.

The great superiority of the clinical evidence over the pure laboratory findings in the differential diagnosis of pelvic pathology cannot be exaggerated. Without in the least decrying the value of the laboratory as an aid to the clinician, we must never forget that it is the man at the bedside who is looking at the patient and who is responsible for his welfare, who is the real diagnostician and it is he who alone should interpret and give proper valuation to the laboratory findings.

I am quite sure that we are all in perfect agreement with Dr. Chipman's teachings in regard to conservative treatment to pelvic infections. Paradoxical as it may seem, he expresses the sentiment of every conscientious surgeon when he intimates that the ideal of surgery would be the suppression of causes of surgical diseases that now require surgery.

While this dream of bloodless and knifeless therapeutics is as futile as it is Utopian, it is none the less true that the more experienced and skillful the surgeon the better he knows how to appraise the limitations as well as the possibilities of his Art. How tempestuous and dangerous may be the untimely interventions of the operating and inexperienced gynecologist in dealing with the acute infections of the uterus and adnexa, and how much safer and less mutilating is the practice of watchful waiting for the acute virulence of the infection to subside, is well demonstrated by Dr. Chipman's abundant experience and observation. To know *when to* and *when not to* operate is one of the finest tests of the surgeon's judgment. It is an attribute of the mind which can be acquired only by long, patient observation and scrutiny of the patient at the bedside. How the laboratory can aid the clinician in his judgments has been well shown by Dr. Polak in his treatment of the toxemias of pregnancy.

The two essays that we have heard tonight are most impressive from the point of view of the greater precision with which the indications and contraindications for operative interference are defined in modern practice and the singularly lucid and instructive way in which the advances of contemporary practice have been exhibited, are most gratifying and will be remembered long after tonight.

ACTINOMYCOSIS IN LOUISIANA.*

HERMANN B. GESSNER, M. D.,

NEW ORLEANS.

It is customary in schools of medicine to teach the diseases frequently met with. In medical societies most papers deal with common conditions. This is as it should be. However, the unusual will occur and when it does the patient needs recognition and cure for his disease. Therefore, conditions like actinomycosis are entitled to a certain amount of attention from us.

Having recently dealt with a case which was recognized early, and having contributed to the making of a late diagnosis in a case that originally had failed of recognition by me and others, I have investigated the incidence of this disease among animals in our section. (Actinomycosis in cattle is known as lumpy jaw or wooden tongue.) An inquiry directed to the Louisiana Live Stock Sanitary Board in October last brought from Dr. E. Pegram Flower, Sec. and Exec.-Officer, this reply: "Only occasionally is a case re-

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ported or a condition of this kind brought to our attention. During the last ten years we have seen but five cases of this trouble." An investigation was then made of the incidence of actinomycosis in humans in New Orleans. In Charity Hospital there have been recorded during the year 1906 to 1927 two cases confirmed microscopically, besides two not so confirmed. In Touro Infirmary during the years 1921 to 1927, five cases were recorded, all microscopically confirmed. These cases include among the microscopically confirmed two of the jaw, two of the lung, one of the pelvis, one of the arm and one of the foot.

Following is a detailed account of a case recently seen and early recognized through microscopic examination.

O. J. H., a white male, aged 40 years, came to the clinic of the Tulane School of Dentistry about August 1, 1927. He complained of a painful swelling over the gums of the left half of the mandible, corresponding to the incisors and the cuspid. Examination of the teeth failed to explain the swelling; a roentgenogram was negative. When he was sent to me I found a swelling at the site above mentioned. My recommendation was that suppuration should be hastened by the use of a poultice and the lesion incised. A few days later I learned that an abscess had been opened which showed no tendency to heal. Suspecting some unusual infection I suggested a microscopic examination. This was made by Dr. H. W. Butler, Instructor in the Laboratory of Medicine of the Tulane School of Medicine, who found actinomyces (group streptothriciae) in smears and succeeded in making anaerobic cultures. By this time an area of induration with purplish discoloration had appeared in the skin over the mandibular lesion. On August 22 the patient was admitted to Touro Infirmary, where, under general anesthesia, the involved parts, from skin to periosteum inclusive, were excised. The bone was found soft and was curetted away; the loose incisors and cuspids were removed. Examination of the tissues by Dr. John A. Lanford, Pathologist at Touro, confirmed the previous finding of actinomyces. A roentenogram of the lungs showed no involvement. The patient was discharged from Touro Sept. 2, 1927, improved. The skin wound healed; the mucous membrane healed but soon reopened, discharging pus in which actinomyces were found by Dr. Foster M. Johns. At this time the case was brought to the attention of Dr. Alton Ochsner, Professor of Surgery in the Tulane School of Medicine, who recommended treatment with radium and massive doses of potassium iodid. The iodid was given in increasing doses until a maximum of 615 drops was given three times daily; this dose was kept up for three or four days. Dr. M. Van Studdiford of the Charity Hospital Staff provided the treatment with radium which consisted in the administration of 3600 milli-curie hours September 30, and 3600 on October 28. Complete healing took place by December 1. On April 5 the patient reported himself fully healed and in excellent health. Efforts were made to determine the source of infection in this case without success. This was a man who had had no relation to the animal industry, but had lived in the city all of his life, had not contracted the habit of chewing grass, straw or grain of any kind.

The patient (G. M.) referred to above in whom the diagnosis was made tardily, was operated on by me for an abscess behind the symphysis menti; no culture was made. Subsequently with the recurrence of the infection he went to a colleague who made two successive incisions; finally he went to another colleague who asked me for information about the first abscess. I suggested microscopic examination which was made by Dr. Foster M. Johns with the result that actinomyces were found.

Comment: The clinical diagnosis of actinomycosis is not readily made unless sulphur granules are seen. Chronic sinuses, skin ulcers with induration resembling broken down gummata, suggest the disease especially about the face and jaws. These cases would be recognized more regularly and earlier if microscopic investigations were made of all abscesses opened, especially those preentsing unusual characteristics. Sulphur granules should be looked for in all suspecious lesions.

It should be borne in mind that actinomycosis treated early when it is only peripheral has a recovery rate of about 90 per cent. Later, when the internal organs (lungs, brain, ileo-cecal regions) are involved, the prognosis is far less good, with under 20 per cent of recoveries.

Dr. Hermann B. Gessner (closing): I have been looking for actinomycosis for many years and these two cases are the only ones, so far as I know, with which I have had direct contact.

I think the difficulty about this diagnosis is the expense of getting the pus found in these abscesses examined. At Touro and some of the other hospitals there is an arrangement made for indoor patients whereby a common charge covers all laboratory work done. However, there is no such provision for the patient who comes in for treatment room work. It is possible that at some future time we may be able to arrange for this also. At present if we bring them in to the treatment room and they pay the hospital $3.00-$5.00 to have an abscess opened, a separate charge of $5.00 or $10.00 for a laboratory examination of the pus is, I think, rather high. I believe this to be the reason why cases of actinomycosis and other unusual infections are so rarely made. The doctor does not feel justified in having his patient pay $5.00 or $10.00 to find out that he is dealing with staphylococcus pyogenes aureus, which is the usual infecting organism.

CONSERVATISM IN SURGERY*

J. F. ARMSTRONG, M. D.,

JACKSON, MISS.

In presenting this short, rambling paper, I do not hope to bring to your attention anything new and startling, but if I succeed in getting any comment, probably the discussion will be mutually helpful.

A paper of this title, "Conservatism in Surgery", naturally embraces a very large field, therefore I shall attempt only to touch the high spots. It is far better to have a live, although physically indisposed patient, than a dead one. Oftentimes in our eagerness to make our patient 100 per cent efficient we take too great a risk. Each patient has a certain vital resistance, the resistance which gives him the stamina to withstand a certain amount of shock either surgical or otherwise. As these patients come in to us their vital resistance is necessarily lowered due to the ravages of the condition which we are asked to relieve.

Should we not therefore treat these patients as individuals and operate for the condition as we find it rather than attempt to perform an operation which we might call standardized? Should we make it a habit to invaginate in all cases of appendicitis, regardless of the condition of the stump we are about to bury or should we look the situation over and proceed with regard to the welfare of our patient and not with the idea of performing a certain routine? Every surgeon feels that when a patient has consulted him and consents to an operation that that patient has placed his life in the surgeon's hands and that the responsibility rests entirely with him. Consequently that surgeon will do everything in his power to send his patient home completely cured. Any mediative or partial cure can not give the satisfaction that a complete and lasting cure can give. No surgeon is capable of putting a valuation on the life of any person, whether that person may be physically perfect or an invalid. Some of the greatest achievements of our nation have been made by people, who from a physical standpoint, are worthless. Consequently we must never overstep our limitations or the physical limitations of our patients in trying to overoperate.

Take, for instance, our cases of appendicitis with abscess. Some of these cases have been ill for many days, their vital resistance is lowered and as a rule they are poor surgical risks. Nature has done her best to protect the patient from a general infection by throwing up a barrier and localizing the infection. We feel that the lives of these patients may be saved if the pus is quickly evacuated and the cavity drained. The abdomen is opened and quantaties of thick pus containing pieces of debris which are probably part of the necrotic appendix, is liberated. We find, on careful digital examination, a well defined wall of adhesions surrounding the abscess cavity. Should we prolong this operation a sufficient length of time, in view of the patient's condition, to separate and remove the remaining stump of the appendix, thereby subjecting our patient to the additional shock and possible spreading of the infection, or should we simply drain the abscess, leaving the appendix alone, not dis-

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turbing the adhesions? My opinion is that the less manipulating done in an acute peritonitis abdomen the better chance the patient has for recovery. It is a fact that some of these patients will return at a future time with symptoms similar to the initial attack and that another operation will be necessary to relieve him completely of his symptoms. However, the chances are that he will be far more able to undergo an operation at this time than before, even though he may see fit to go to another surgeon for his second operation, which he will very likely do.

Acute intestinal obstruction frequently gives a surgeon a chance to over-operate. The patient is badly shocked, pulse weak and thready, a history of total obstruction for many hours or even days. Is it not better to do a rapid enterostomy under, possibly, a local anaesthetic, than a complete exploratory operation, subjecting your patient to additional shock and danger of death? Frequently we see these patients relieved entirely of their obstruction without a secondary operation, due to the release of pressure. Even though a secondary operation is necessary we will have a patient much more able to undergo it.

The gallbladder is probably the most over-operated upon organ in the body. Unaminity as to the surgical technique involved in the removal of the gallbladder has been very much more definitely reached than has unaminity of judgment as to the relative merits of cholecystotomy and cholecystectomy. The relative risk involved, however, is a matter of common sense. It may be said that in America, at the present time, there is a tendency to entirely remove the gallbladder whenever there is occasion to operate on the biliary tract at all. While there is no hard and fast rule to determine which cases shall be subjected to the former and which to the latter, it seems possible that many are sacrificed without full warrenty, which under incision and drainage should remain useful organs. There is a human tendency to treat lightly an organ whose presence seems not to be imperatively necessary in the physical economy, even though unfortunate errors have been made in the past in regard to the total removal of the structures then considered unnecessary. Abroad the gallbladder appears not to be so sweepingly removed as in our own country. Besides the removal of the gallbladder does not prevent, absolutely, the formation of gallstones and infection. They may subsequently occur in the common duct. Mayo Robson questions whether the common duct does not subsequently dilate and become, practically a gall resevoir, a secondary gallbladder, as he and others have encountered in some cases. He further states that: "At best, it is merely an expression of ignorance to say that the gallbladder has no useful purpose to serve." Surgical knowledge, at best, is very limited, indeed, exceedingly limited, and greater modesty of judgment as to what is and what is not necessary, might serve both patient and surgeon more substantially than the total sacrifice of any structure without very good and incontestible reason for its loss. It is of course necessary, at times, totally to remove the gallbladder, but the routine removal of this organ can only be condemned.

Certainly, it takes more nerve on the part of the surgeon to leave a part of a sloughing appendix or an obstructed intestine, for he will have to face the patient's relatives and admit that the operation has not been completed in detail and that a secondary operation may be necessary. But I believe that the average surgeon will be more than repaid for pursuing the conservative course by a decided lowering of his mortality.

Conservatism in surgery is becoming more and more universal every day. The many stage operations are more common than ever before. Patients are given better attention prior to the operative procedure. It is not rare to witness a many stage thyreoidectomy, cholecystotomies and enterostomies are frequent. Cancer of the sigmoid and rectum are not removed in one

stage operations any longer. Many stage operations are the methods of choice.

It is the custom of some men to remove the appendix routinely but if this is done consistently it can lead to nothing but harm for the patient. After a prolonged operation for pus tubes, uterine fibroma or operations on the upper abdomen the added time and shock, even though it may seem negligible, may lead to a prolonged convalescence or even death of the patient. Every surgeon will go far to preserve ovarian tissue for the function of the ovarian tissue is well understood and is known to be so necessary to the welfare of the patient. He always feels a sense of keen disappointment when he finds it necessary to remove any particle of ovarian tissue.

Just a word to incisions. Every one will admit that small incisions are very neat and altogether pleasing to the patient, but are they as efficient as the larger ones where it is possible to explore more easily with less traumatism to the tissues and with more thoroughness? Many incipient pelvic lesions can be corrected very easily, hereby, probably saving the patient much discomfort and maybe another operation. The larger incisions will heal just as rapidly and with practically as little pain and will certainly give the surgeon a better chance to do a thorough operation.

I do not wish it to be understood, by what I have said, that by conservatism I mean doing as little as possible in an operative way, but merely to limit the operative manipulation in our patients who come to us in critical conditions. On the other hand it may be necessary to do a far more radical operation than may seem necessary, in order to be conservative in some cases. Malignant tumors of the extremeties can be taken as an example. It is not conservative to remove as little as possible of the member in order to save as much apparently normal tissue as necessary in order to be sure that all of the offending growth has been eradicated.

Dr. S. W. Johnston (Vicksburg): Dr. Armstrong's paper emphasizes my views exactly in conservative surgery. There is one thing, however, he did not mention—that is conservation in pelvic surgery. I think most conditions of the tubes will clear up without any surgery whatever. I believe in gonorrheal salpingitis, the diathermatic treatment combined with hot douches and absolute rest in bed will in a vast majority of cases give gratifying results. As to intestinal obstruction he is absolutely right. In cases seen after 24 hours an enterostomy is the only surgical interference that should ever be attempted. A large number of cases will recover without any further surgery, but of course there are some in which a second operation would have to be done. To hunt around in the abdomen looking for an obstruction with a patient shocked and dying from toxic absorption is not the work of a true surgeon. Restore the loss of your blood chlorides with intravenous saline injections, stimulate your patient and give them absolute rest. A local anesthetic should always be used when possible, this itself lowers your mortality. I enjoyed the paper very much.

Dr. J. A. Crisler (Memphis): I think all surgeons will agree with Dr. Armstrong. Let's not merely call it conservative surgery, but good surgery. There is one point that I would like to emphasize, that I believe is conservative surgery in cases of acute intestinal obstruction. The reason we have deaths from intestinal obstructions is first, that we have dammed up behind the obstruction a fecal current which becomes intensely toxic and beyond you have a ribbon shaped gut that is hungry and dry. When you overcome the obstruction and let this current full of intensely toxic material pour down into your really healthy ribbon gut, that is flat and hungry, you get an acute absorption that will kill your patient sometimes in twenty-four hours.

Now here is one little trick that we have adopted in relation to that. We will say we have an enormously distended intestine above the obstruction and below you have a flat, ribbon-like gut. You generally find your obstruction quicker by following this ribbon gut here to the point of obstruction than any other way. Now, it is a calamity if that obstruction has remained intact for a period of twenty-four or thirty-six hours, to release the obstruction. Pull this distended gut over and empty it. It is best then to take a needle and fill this hungry gut full of saline solution. You have then fed this hungry gut so that when these remaining poisonous elements go down 't, the absorption has already taken place and they find that hungry gut already filled.

Dr. H. A. Gamble (Greenville): Dr. Armstrong has voiced a reference to the conservative treatment of all the conditions enumerated, and particularly so of intestinal obstruction. While I feel that beyond the fact that operating for intestinal obstruction is simply to put a tube in and get out the pus, yet it depends upon what kind of obstruction you are dealing with. If you are dealing with adhesions that is all that is necessary. If you are dealing with cancer, your patient dies. Sometimes you have to do a resection. If you are dealing with an intussusception, you have to, as a general rule, not overlook the fact that you have this dammed back poisoned material. We usually when we are dealing with cases of that type, put a large tube in the bowel, invert it and push it up and it occludes the bowel at that point temporarily, and that intestine will drain out in the first four or five hours. In the course of a few days the tube will loosen up and the intestinal tract is open and you get a natural reaction. If you do not adopt more active measures than simply draining the bowel, the patient would certainly succumb to the pathology.

RADIUM IN THE TREATMENT OF UTERINE DISEASE.*

WALTER W. CRAWFORD, M. D.,

HATTIESBURG, MISS.

In view of the fact that Dr. Holmes will also read a paper on the above subject, my discussion will be very brief. Three forms of pathology will be considered:

Uterine bleeding—Benign.

Fibromyomata.

Carcinoma of cervix and fundus.

UTERINE BLEEDING—BENIGN.

After eliminating the cases of uterine bleeding due to incomplete abortions and granular endometritis, there is left a rather large group of patients in whom the curet, ergot and pituitrin utterly fail to bring relief. This last group ranges from young girls to women above fifty years of age. Some of these give the history of almost a continuous menstruation lasting, as in one of our cases, five years. Others bleed so excessively at their regular time that it is not possible to manufacture an adequate supply of blood during the short intervals between, hence they become victims of an ever increasing anemia. During the past three years we have had occasion to treat seventy-one cases of this latter group with radium. They ranged from twelve to fifty-seven years. All of them have made a very satisfactory response to the treatment.

If one bears in mind the age and end result desired in each patient and administers only the number of milligram hours necessary to attain same, he may confidently expect relief. Patients who have reached the age of forty and are presumably beyond the child-bearing period are given a larger dose with the deliberate intention of permanently suppressing the menses. If any doubt exists as to the possibility of an early malignancy the dose is materially increased. In young girls and young women, both married and single, it is highly important that no permanent damage be done to the ovaries, therefore a minimum dose is given.

If the patient is quite anemic from loss of blood, the dose should be larger than in those cases in which hemaglobin is above 60%. It is desirable in this type to stop menstruation entirely for two or three months, during which time the blood may be restored to its normal balance. If patient's condition does not make this necessary, then only enough radium should be administered to regulate the menstrual flow. When the minimum dose of radium has been administered the patient is told that a second dose may be necessary to attain the desired end. We have only found it necessary to repeat our treatment in two cases. This was two years after the original dose.

In one of our patients, a girl of nineteen who had menstruated almost continuously from the age of fourteen, and gave the history of two previous treatments with radium in one of our larger cities without relief, nine hundred milligram hours produced a very happy result.

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In answer to the frequent question, "Will radium produce permanent sterilization?" I wish to emphasize the fact that an adequate dose to correct benign bleeding will not produce permanent suppression of menstruation, and, therefore, will not produce sterility. Many of our cases were among school girls and no check could, of course, be made on them; but two young married women who had hitherto been sterile became pregnant a few months after treatment with radium.

A patient consulted us last week who, in 1924, at the age of 37, was given 1,800 milligram hours of radium on account of excessive uterine bleeding. She weighed more than two hundred pounds and was excessively nervous. Her menstruation stopped for one year then appeared at three month intervals for five years, and during the past year has recurred at intervals of two or three weeks, though in a small amount. She is no longer nervous and has lost more than fifty pounds. Examination revealed a small uterus.

This case is related as an illustration of the fact that, instead of producing nervousness, as is contended by some, radium may actually relieve that condition.

UTERINE FIBROIDS.

In order to secure best results, careful discrimination must be made in the selection of types of fibroids for treatment with radium. Very few fibroids larger than a four months' pregnancy should be chosen, though occasionally good results are noted in larger ones. Smooth myomas respond in a very satisfactory way; on the other hand, the pedunculated type and most multiple fibroids of extramural type should be treated surgically.

Great care should be exercised in an effort to exclude all cases complicated by tubal or ovarian infection. Our first case belonged to that group. Despite a careful pelvic examination and negative blood count, this case, a negro woman, exhibited an active flare-up in tubes a few days after treatment and was violently ill with pelvic peritonitis several weeks.

If one application of radium does not cause some reduction in the size of the neoplasm subsequent radiation will usually be attended with failure. Per contra, a second dose may be indicated to complete retrograde evolution when the first dose causes shrinkage. We have not found more than two applications helpful in our cases.

A patient consulted us on April 26 who was having hemorrhage after four doses had been given in another clinic without affording relief. Such a case should, of course, be given the benefit of surgery rather than further radiation, as requested by her.

CARCINOMA OF CERVIX AND FUNDUS UTERI.

Uterine malignancy in its various forms has always been a disappointing field for the surgeon. The primary cause for this has been failure on the part of the patient to consult the family physician until the disease had already metastasized. The surgeon has not only to reckon with the immediate operative mortality but recurrence from malignant cells that may have already been transported to points beyond the uterine wall. Wertheim, many years ago, undertook to neutralize this disadvantage by an extensive dissection of the pelvic glands. His statistics showed an improvement over the old technique, but, in addition to the fact that it increased the surgical mortality of the average operator, it did not approach the ideal in end result.

During the past decade radium has become the procedure of choice because of the fact that it has yielded a higher percentage of cures among the early cases than surgery, and is applicable to the large group of advanced, and, therefore, inoperable cases, that had hitherto been classified as hopeless.

This accomplishment is attained by an immediate mortality of negligible proportion and a minimum hospitalization.

Many of the cases of neglected carcinoma of the uterus are directly traceable to fear and prejudice on the part of patients to surgery. Women who oppose what they regard as mutilating operations readily consent to the use of radium. It is, therefore, a reasonable supposition that, when they shall have learned that there is an equal if not better chance to solve their problem through the conservative use of radium than by the knife, they will present themselves for examination at an earlier date than in the past, and thus make a material contribution to the percentage of cures.

The number of cases that present themselves to our clinic each year that are too far advanced even for palliation with radium illustrates the need for further education. Unfortunately this need is not confined to the uninformed. We have under our care at this time a graduate nurse who had been on duty in one of our larger hospitals during the past three years; and when she reported to us for treatment we found that she had an advanced carcinoma of the cervix that must have produced symptoms at least two years ago. She, of course, belongs to the group of fatalists who hide behind the belief that some how or other they will escape punishment for violation of nature's laws.

We have treated sixty-six cases of carcinoma of cervix and uterus in our clinic since 1924. Of this number there were

11 cases of fundus

3 cases of fundus and cervix

52 cases of cervix

Deaths:

Of this number 10 have died.

Of these were

4 uterine.

6 cervix.

Interval since treatment:

5 cases 1924, 4 living, apparently cured.

15 cases 1925, 11 living, 10 apparently well, 1 with metastasis.

23 cases 1926, 18 living, apparently well.

17 cases 1927, 16 living, apparently well.

7 cases 1928, 7 living.

48 out of 66 are symptomatically cured.

7 are under treatment at this time.

1 has pelvic metastasis and will die.

None of the above group is beyond the five-year period and, therefore, we can reasonably expect a few additional deaths.

Ten of our cases were given a second dose. Of these, six have died.

This prompts the discussion of the important question of

DOSAGE

So many factors enter into the successful treatment of malignant diseases of the uterus with radium that it is not advisable to be dogmatic in outlining a program. It would seem that best results are obtained when the total treatment is completed in one week rather than to administer a smaller amount at intervals of several weeks, as advocated by some radiologists. The technique and distribution of the radium are of prime importance.

In discussing radium with a few men who have secured indifferent results in treatment of cancer of cervix we have found that they have depended upon capsules as containers. If these same operators will use ten milligram steel needles or implants and distribute them in the cervix so that they will secure cross-firing and exposure of the entire field to radium rays, they will find that the end result will be greatly improved. In advanced cases, and especially the cauliflower type, a preliminary removal of proliferative and necrotic tissue with an electro-cautery will be of especial advantage.

COMPLICATIONS AND SEQUELLAE.

Sepsis: Care must be taken to exclude infection either in the adnexa or in the necrotic tissue of an advanced case before

applying radium; otherwise, an acute sepsis may result. One of our advanced cases of cervico-uterine types developed a temperature of 103° at the end of twenty-four hours and died of sepsis within one week. This case, and the one with fibroid mentioned above, are the only two in our total series; but both were sufficiently dramatic to emphasize the importance of careful selection of one's cases.

VESICO- AND RECTO-VAGINAL FISTULA.

In order to obviate the development of fistulae in cases in which there is infiltration of the vagina and rectum, it is necessary to reduce the time exposure in that region to the minimum. If necrosis is extensive in this region radium should not be used, as it will hasten formation of fistula. One of our first cases developed an extensive vesico-vaginal fistula.

Leukorrhea: Most of the cases have leukorrhea lasting from one to several months. If the condition is due to vaginal irritation, mild alkaline douches relieve it. If due to an unhealthy endometrium, applicatons of 2 per cent mercurochrome will relieve it.

Ulceration of bladder, when seen, is a late manifestation. It is often six months and even a year before the symptoms appear. Argyrol instillations will usually relieve it.

PROGRESS OF HEALTH WORK IN MISSISSIPPI FLOOD AREA.—The evolution of the efforts of the American Red Cross and the co-operating agencies during the early stages of the catastrophe into eighty-six full-time health units concerned with the conservation of public health is regarded by Charles N. Leach, New York, as being one of the gratifying developments of the past year in public health work in the United States. Smallpox morbidity shows a significant reduction in forty-one counties of the flooded area of Kentucky and Louisiana, while the smallpox morbidity of those two states as a whole was increased. The death rate for marlaria in fifty-five flooded counties in Kentucky and Louisiana shows an annual decrease over a period of ten years. The increase during 1927 is not out of line with the downward trend for the period as a whole. The death rate for pellagra in Kentucky was on the decrease over the first eight years of the period but increased in 1926 and 1927. In Louisiana the death rate for pellagra was practically constant throughout this ten year period. The death rates for typhoid, infantile diarrhea and diphtheria in the fifty-five flooded counties of Kentucky and Louisiana for 1927 did not show an appreciable variation from the trend for the past ten years. Jour. Am. Med. Assoc., 91:1595-1599, 1928.

THE USE OF RADIUM IN MALIGNANCIES AND CERTAIN GYNECOLOGICAL CONDITIONS.*

T. W. HOLMES, M. D.,

WINONA, MISS.

Twenty years have come and gone since radium was first used in gynecology—the therapy is now world-wide and occupies an enviable position co-ordinate with surgical and medical measures. Radium is used with variable success in cancer and other lesions.

Radium is a metal combining with various acids to produce salts. It belongs to the group headed by uranium with lead perhaps the last element. The entire series, except the ultimate lead, undergoes atomic decay. This instability varies enormously in several members of the group. It is lowest in uranium, very slow in radium, quite rapid in radon, and extremely rapid in active deposits made up of elements termed radium A, B and C. In this transformation from one element to another, three kinds of rays are emanated: the alpha, beta and gamma. Practically only the gamma rays are used in gynecology.

The indications for the use of radium and the treatment of pathogenic lesions of the uterus has been definitely defined since 1920. The dangers or contra-indications to its employment have been equally clear. While it has not proved as widely efficacious as at first thought to be, its results in certain conditions have been demonstrated to surpass those of any other treatment heretofore employed.

The three conditions which are obtained in every radical operation of cancer of the cervix, blood loss, trauma, and prolonged anesthesia, are eliminated, thereby obviating the reduction in tissue reaction and general vitality which these three factors produce.

The indications for the treatment of fibromyomata involving the body of the

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*Read before the Mississippi State Medical Association, Meridian, Miss., May 8-10, 1928.

uterus are variably interpretated by surgeons and radiologists. The logical analysis of the situation appears to be as follows: In women under forty presenting such a growth, the treatment of choice is surgical removal. In case the hemorrhage has been too severe to interfere with the safety of the operation, it might be well to use a sufficient dose to check hemorrhage in order to prepare them for operation. The younger the patient the greater the importance of the preservation of the ovaries, because of the internal secretion and the part they play in the establishment and maintenance of the sex function, particularly in the earlier years of life. (As opposed to operation with the two per cent risk are those who desire and prefer irradation, even though it involves destruction of the ovaries, rather than operation with its concomitant pain, discomfort, confinement and convalescing.) At and after the age of forty the child bearing function of the uterus has usually been fulfilled. At this age irradiation finds a comparatively wide field of usefulness, its limitations being determined by the size of the tumors and their situation. We have employed radium alone in ten cases of fibroid uterus with a gradual reduction in size of tumors with complete cessation of symptoms.

About ninty-six percent of cancers of the cervix are in women who have borne children, usually with a history of miscarriages or instrumentations. There is usually a slight laceration of the cervix. It is possible to have carcinoma of the cervix in a woman who has had no children, no miscarriages, no instrumentations. We have had one in a woman aged twenty-five years, with a well marked cancer of the cervix, followed by complete healing after the use of radium. Every erosion of the cervix is a potential cancer. Dr. Ewing says that evidence points to the origin of carcinoma from previously normal adult cells which pass through a series of changes induced by chronic irritation and terminates in carcinoma.

There appears to be only one known way successfully to combat the high mortality of cancer and that is by recognition of the process in the earliest stage, or better to identify those which are definitely known to be the forerunner of malignancy in a very great majority of cases. The cervix, because of its location is strikingly susceptible to infection, trauma, and malignancy.

The deaths from cancer of the cervix are nearly twenty thousand in the United States each year. Thirty-five percent of all cases of carcinoma occurring in women have the origin in the uterus, and about 98 percent of those develop in the cervix. One woman out of every twenty-seven dies with uterine cancer.

There are four predisposing reasons why the cervix is so susceptible to cancer formation: First—two distinct types of cells join at the external os, the squamous cells of the vaginal portion and the columnar cells of the cervical canal. This is known to favor distorted cell activity, especially so when the conditions such as have been mentioned are active. The complex cellular character gives a very unusual picture to many of the lesions occurring here. Second—trauma, due chiefly to injury at childbirth. Third, and most important—infection, acute and chronic, especially the chronic. This is the chief complication involving the cervix that produces prolonged irritation. It is the best example of chronic irritation predisposing to malignancy. Fourth—discharge. This is the natural result from an injured tissue. It is secondary reaction resulting from infection.

The cause of cancer is still unknown—by this we mean, we do not know precisely just why cells disobey the laws of natural reproduction and grow wild. In the absence of this knowledge of the specific cause of the disease, it seems reasonable to assume that these predisposing lesions are of the utmost significance, and that a great deal more attention should be given the cervix and its lesions than is customary.

SYMPTOMATOLOGY AND DIAGNOSIS.

Nearly all cervical lesions produce excessive secretions. A woman who complains of both discharge and bleeding should be suspected of having a beginning malignancy. It should be taken as a logical deduction that hemorrhage as a symptom in a woman over forty years of age should always be considered to be due to malignancy unless proven not to be. Also recurrence of vaginal hemorrhage after the menopause is practically always due to cancer. Chronic irritation such as has been mentioned should be corrected. So important is the lesson that not a few students of cancer have given this as their opinion that probably more cases can be prevented than cured. We urge all women treated with radium for cancer of the cervix to return each month for six months for observation, and try to keep under observation for at least five years. If they are well at that time, we feel that we have perfected a cure. In the cervix the reaction to radium is so nearly uniform that if a case progresses satisfactorily so that we can tell if they need a second dose, there are usually five stages. One week after the first dose has been applied, the tissues of the cervix with the carcinoma and the adjacent mucosa of the vagina are usually red and hyperemic, the blood vessels following the use of radium are engorged, and operation is contra-indicated on account of hemorrhage. Usually a month after the radium is used the cervix shows a greenish slough, and a foul discharge from the broken down cancer tissue. Not all cases slough at the same time—some are faster than others. Two months after treatment, the appearance of the cervix is changed due to the slough having separated, leaving a clean, dusky, red cervix, somewhat glazed, but no clinical evidence of carcinoma.

The third and fourth month should show a stage of contraction. The connective tissue is excited by irridation, and markedly reduces the size of the cervix as well as the vault of the vagina.

The selective and destructive action of radium upon cancer cells, either destroys outright, or stunts some of the cells, but the principal inhibiting action of the radium on cancer is in the stimulation to growth of connective tissue, which enmeshes the cancer cells, shuts off the blood supply and starves the cancer by forming a barrier zone and this imprisons its victim for a period that may be long or short. At the end of six months, the final stage of contraction is reached. The cervix is very much shrunken—looks like it may have been amputated. If this stage is not reached in six months, we give a second dose of radium.

In uterine bleeding of functional origin, radium stands practically as a specific and as a rule requires but one dose.

The value of radium in cancers of the mouth, nose, pharygnx, laryngx, esophagus, stomach, is stated to be bound up in the technique used. One cause of disappointment with radium work in cancer comes from inability to do massive work with small quantities of radium. The dose of radium should be a massive initial dose. We use the needles and capsules. Some use a fractional dose, repeated at intervals, but this method is not so popular.

Of our series of fifteen cases of cancer of the cervix, all inoperable, two are dead, five living four years after treatment, five three years; of the two dead—one lived a year and a half and one six months. Of two cases of cancer of the bladder treated, one died six months after treatment, one still living eight months after treatment.

DISCUSSION.

Dr. J. H. Barksdale (Jackson): We will first hear discussion from the floor. No response, so I am not going to let it go by default. I sometimes feel perhaps that I have become a radium enthusiast, perhaps an ultra enthusiast.

The subject is too broad to attempt to discuss in detail. We had this up at the Radiological Section last night. I think if Dr. Crawford had

gone back one year and could have started his search from 1923 instead of 1924 it would have been better. I think he has gotten his dates mixed up.

Not intending to discuss this paper I have no statistics available as to the mortality rate we have had in carcinoma of the uterus and elsewhere but I do know that our mortality has been tremendously decreased over the old methods. I do know that everything tends to prove that radium alone has a distinct and decided advantage over radium plus surgery and that surgery is the last thing to be desired in cases of cancer as we view the case at this time. I am speaking solely of uterine cancer. In the past five years I have not operated on a single case of cancer of the uterus, and I think, as I see it now, that I shall never operate on another case as long as I live, and with me that almost includes cases of cancer of the fundus which are rather considered to be surgical conditions. I feel very much the same way about small myomatas or fibro myomata, more particularly the myoma, which is the safer type and more amenable to radium with the limitations that were so well explained by Dr. Crawford—that is where you have a smooth, even uterus, not a potato-like growth or excrescence, but where radiation can be equally distributed. In cases that do not exceed three to four inches in diameter and probably are more than 3 or 4 or 5 inches from fundus to cervix, we still think and believe that radium is the elective procedure and not surgery.

I think we become wedded to certain procedures, and the surgeon is slow to give up the operative procedure. If he is still in his early years, there is a glamor about operative proceedings that does not attach to a single every day sort of thing like the application of radium, but that glamour or enthusiasm should not lead us into imperiling the lives of our patients, when we feel that we have something that is not equally as good but as Dr. Crawford says, is better, and that can be considered with a minimum of loss of life, with a minimum of hospitalization, and with a maximum of good.

Dr. W. W. Crawford (Closing): I haven't anything further to say. There are a great many things left unsaid. It is rather like discussing the anaendix; you can talk about it all day and still there are some angles that you haven't touched.

THE CLINICAL VALUE OF THE NEUTROPHILE NUCLEUS INDEX, THE LYMPHOCYTE INDEX, AND THE MONOCYTE INDEX IN TUBERCULOSIS.*

WALLACE J. DUREL, M. D.,

NEW ORLEANS.†

During the past twenty years, the weekly examination of blood smears stained and fixed with Wright's stain, has been a routine practice at the sanatorium and clinic; and the thousands of blood slides examined have lead to conclusions which I feel are of some clinical value in tuberculosis.

Fifteen years ago, in a paper read before the National Association for the Study and Prevention of Tuberculosis, I was privileged to mention the neutrophile nucleus index as a guide for the administration of the tuberculins. Since then, hundreds of cases of tuberculosis, mostly in the advanced stages, have been treated and given tuberculin—bacillus emulsion, or old tuberculin (Koch)—in various doses, ranging from .01 octillionth of a mgm. to twenty-five miligrams, and the intervals between doses have depended upon variations in the neutrophile nucleus index.

The neutrophile nucleus index is the percentage of polynuclear neutrophiles with a single lobe nucleus, or with a nucleus showing several lobes, all connected with an isthmus band.

Arneth's index is not the same, and varies from the neutrophile nucleus index, in that no difference is made in the Arneth index whether the lobes in the nucleus of the neutrophile cells are connected or not by isthmus bands. That the polynuclear neutrophiles, through their phagocytic and antibody properties, play an active part in the combat of the tissue cells against in-

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vasion and destruction by the tubercle bacilli, I feel no one can rightfully deny.

The very "active" and toxic cases of tuberculosis, always show an increase in the number—of polynuclear neutrophile cells, and a high neutrophile nucleus index.

Recently, the monocytes or large monuclear cells have been studied, both in the animal and in man, and present conclusions show that the monocytes are always increased, in the blood circuit, in the very "active" cases of tuberculosis. My own observations, although not complete, corroborate this fact. When both the polynuclear neutrophiles and the monocytes are constantly increased in number, it means a more severe infection than when the number of these cells fluctuates and falls within a short time.

It has been my good fortune to observe, years ago, that the neutrophile nucleus index is always above 94 in the very "active" tuberculous, or when allergic phenomena of tuberculosis are sufficiently strong to be denoted by the presence of physical findings and clinical symptoms. Thus, with an index of 94 or below, one can justly feel that tuberculo-protein toxins are not freely liberated at the time, and tuberculin, in qualified and graded doses, depending upon the "activity" in the foci of infection, can be safely administered. There is no danger of accumulative doses when the neutrophile nucleus index is used as a guide for the administrations of the tuberculins.

I hope it is well understood that, cases showing great "activity" in their lesions, and who are constantly absorbing, from the foci of infection, tuberculo-proteins in large quantities—surely do not require additional doses of cultural tuberculins.

Those of us who do not concur to the fact that the tuberculins are of value in the treatment of pulmonary and other forms of tuberculosis evidently have not thought of what is occurring in the tissues of the tuberculous patient who shows symptoms and physical findings which, after all, are nothing more than manifestations of various allergic reactions, due to the liberation of virulent tubercle bacilli or their tuberculo-proteins, from foci of infection. The changes in the blood cells of the tuberculous are apparently due to the effect of some stimulus, probably a tuberculo-protein substance, upon various or particular cells. How often we see cases of tuberculosis, even in the advanced stages, lose their toxicity and clear their gross lesions, after weeks or months of persistent hygienic and rest treatment. What has been the reason for the improvement and sometimes the healing of the lesions in such cases? Tuberculin, or the tuberculo-proteins liberated from the patient's tuberculous foci. These tuberculo-proteins liberated by the tubercle bacilli have, through their allergic inflammatory reactions in the tuberculous foci, started a fibrosis which slowly replaced the softened and cavernous areas resulting from the necrotizing action of the large quantities of bacillary poisons upon hypersensitized tissues. Here we see why the action of tuberculin has been compared to a double edge sword.

Unfortunately, even the most rigid and prolonged hygienic rest treatment will not always cause the absorption and complete cicatrization of diseased foci, without the additional aid of one of the tuberculins.

Here, I will say, that a tuberculin immunity is long to acquire, and necessitates large doses of tubercle bacillary products, generally. Of the large number of our cases who have acquired an immunity to tuberculin, *i. e.*, who ceased to react repeatedly to 1 mgm. old tuberculin, in the skin, I have not seen one relapse during the past twenty years.

A few who had ceased to react to ten milligrams of old tuberculin, subcutaneously, have relapsed; but most of such cases have remained well for five to twenty years. This is the great test in the treatment of tuberculosis. How long does a patient remain cured?

I feel from observations made, that the neutrophile cells play an important role in

warding off more extensive lesions and severe infections. In the allergic reactions of the tubercle bacillus and its various by-products, the neutrophiles are in evidence.

The predominating number of polynuclear neutrophile cells present in the softened area of a reacting papule, following the intracutaneous injection of dead tubercle bacillary bodies in a tuberculous subject, is a display of nature's first efforts to protect itself, through an inflammatory exudative process, and to, thereafter, heal the diseased areas by favoring the formation of scar tissue.

The preponderance of polynuclear neutrophile cells in the reactive exudate, occurs in tuberculous foci elsewhere in the body, when focal reactions follow the administration of reacting doses of tuberculin, subcutaneously.

The blood examination of one who reacts constitutionally to the subcutaneous injection of tuberculin, illustrates most conclusively that an actual increase of polynuclear neutrophiles takes place during the height of a moderate constitutional and focal reaction. This fact is disputed by some.

The quality of the neutrophiles is also affected, as seen by the high increase in the percentage of polynuclear neutrophile cells with one solid lobe nucleus. The patient with little clinical manifestation of tissue resistance always shows a large number of polynuclear neutrophiles with a solid lobe nucleus; because the newer neutrophiles constantly flowing in the blood circuit, in such cases, are endowed with less phagocytic and antibody action than cells with separate multiple lobes.

These changes in the neutrophile blood picture are peculiar to all cases in whom tuberculin causes a focal and constitutional reaction, and are dependent upon the state of "activity" or "latency" of the lesions, and the size of the dose of tuberculin administered.

The matter of reaction to tuberculin will be discussed in another paper. Note, from the study of blood smears, that the neutrophile nucleus index returns to its previous state, from a few days to a few weeks, after a reaction to tuberculin. This is the reason for not giving tuberculin oftener than every two weeks, in cases where the neutrophile nucleus index is not used. Otherwise, by accumulating from repeated reactions, an excess of new neutrophiles in the circulating blood—this occurs in different degrees in all reactions to tuberculin—one decreases instead of increasing tissues' cellular resistance. Give time for the new cells to mature.

The old saying, that the polynuclear neutrophiles increase in number and the lymphocytes decrease in number, in the more active cases of tuberculosis, has been repeatedly observed in my series of cases.

Now, we further know, that the ordinary toxic state following a reaction to tuberculin is also attended by an increase of polynuclear neutrophiles, with an increase, in the circulating blood, of monocytes or large mononuclear cells; and with a decrease of lymphocytes. This, however, is only temporary.

Cases thus reacting have generally shown an increase in the total count, but this increase is not great and is dependent upon the severity of the reaction.

The average case of tuberculosis, especially the class (A) patient, does not show an increase in the total white blood count.

It has been my experience to find, in the more "active" cases, a high lymphocyte index; which means that there is a decrease of lymphocytes in the circulating blood.

A low lymphocyte index means a higher percentage of lymphocytes in the blood circuit, and is always of a good prognostic significance in tuberculosis. As a rule, I have found a low lymphocyte index in children with hilum tuberculosis.

The low lymphocyte index persists in many cases that are clinically well, but who still react to the intracutaneous tuberculin test. When the disease has been completely eradicated from the tissues, the blood picture should return to that of the nontuberculous individual, *i. e.*, one who does not react to tuberculin intracutaneously.

A low lymphocyte index, especially below 1.5, is of some corroborative diagnostic value, as well as of good prognostic significance.

The recent work of Cunningham, Sabin, Morris, and others, relative to the monocytes being particularly confined to the tissues of the tuberculous, and finally being converted into the epithelioids of the tubercle—has lead me to tabulate the monocyte index, with the other blood pictures.

I hope to take up, at some future time, the deductions I have made concerning this phase of the life of the monocyte. The profession certainly owes a debt of gratitude to these workers for drawing our attention to the action and behavior of the monocytes in tuberculosis. The finding of the monocyte index is accomplished according to the suggestion of Morris and Tan, *i. e.*, is nothing more than the division of the lymphocytes by the monocytes.

The cases that I have followed up to now, and the final conclusions which I hope to report later on, show beyond doubt, that the more "active" and the more toxic the patient, the higher is the number of monocytes in the circulating blood, therefore, the lower is the monocyte index. My observations up to the present day, show that, in the very "active" and toxic cases of tuberculosis, there is a rise in the neutrophile nucleus index, a rise in the lymphocyte index, but a fall in the monocyte index. When the three indices thus show in the same patient, I feel that, as a corroborative factor to the clinical and physical findings, we can safely state that the case is "Active."

This is a great addition to our armamentarium in the diagnosis and prognosis of tuberculosis.

The changes in the neutrophile index, the monocyte index, and the lymphocyte index correlate so well with the clinical and physical findings of the patients, that I feel with these indices we have valuable corroborative evidence of the nature of the disease under consideration, and surely are more enlightened relative to certain phases of tuberculosis. In guiding our patients through the long siege of this disease, we have in the neutrophile nucleus index a gauge for rest and exercise, and for the administration of tuberculin.

Conclusions from observations made up to date: Cases of hilum and pulmonary tuberculosis who are clinically "inactive," show a lymphocyte nucleus index varying from 0.7 to 1.8, and a monocyte index varying from 3.7 to above 17. A neutrophile nucleus index varying from 94 to 75. In cases of mild "activity" the lymphocyte index ranges from 1.6 to 3.1, and the monocyte index 1.8 to 8.6. The neutrophile nucleus index rises more frequently above 94. The very active and toxic case gives a lymphocyte index from 2.6 to 7.5, and a monocyte index from 0.7 to 3.6. The neutrophile nucleus index rises oftener above 94. In a very toxic case, the lymphocyte index ranges from 3.6 to 7.1, and the monocyte index from 0.6 to 2.1. The neutrophile nucleus index seldom falls below 96. Following a reaction to the subcutaneous injection of old tuberculin in reactive doses, there is aways a marked rise in the lymphocyte index and a fall in the monocyte index. The neutrophile nucleus index also rises above 96. The total count is slightly increased, according to the severity of the reaction.

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DISCUSSION.

Dr. P. H. Jones, Jr. (Baton Rouge): I find myself just a little nonplussed as how to begin, first, on account of the remarks of the chairman, and, secondly, because Dr. Durel has put us in the middle of a subject that he could talk for hours upon and still have much left to tell us.

Tubercuosis is a subject of such long duration, such a varied picture, and most everyone is seeking so carefully for a means of making the a means of making the prognosis that we are all very much in debt to Dr. Durel for giving us such means. He has been talking about the counting of various white cells in the blood smear, so long as I have known him and probably before, and now that these cells are getting into a state of their own justified prominence, I am sure his observations would be of great importance to those who are endeavoring to pilot these cases.

So far as the neutrophilic index, I think he must have intended for me to say something in regard to that, because the monocyte I leave to those who have made friends with that particular cell and know it personally. He and I have had quite a vigorous discussion as to what was the monocyte and how we could label it, and we agreed, and, so far as we were able to determine, there were standards of techniques and routines laid out so we could recognize this new friend of ours. Personally, I think most laboratory workers would find little trouble right now in agreeing with each other, or with the originators of the subject as to what was a monocyte.

In regard to the neutrophilic cell, I have a little more personal friendship and can say when a case is reacting favorably to an administration of tuberculin; the number of lymphocytes with split-up nucleus is increasing; when the tuberculin is of slightly too much in amount, the number increases. In other words, the nearer the cells approach the simple type of nucleus, the more trouble the body is having in providing these cells, and the more strain.

That observation has seen no parallel with the way the patient feels. If they tell you, at the end of the week, that they have a cold, that they do not feel well, that they are generally in a state of malaise, on those occasions, the number of polynuclear neutrophiles with the nucleus split into two or three parts, will be around two or maybe four, that is, that will be the percentage. When they feel fine, it will be around eighty or ten.

Dr. Durel mentioned the much discussed point, or rather his, that a single nucleus or those many nuclei, so far as the practical application to those patients is concerned, it does not make any difference; the fact remains that if you do not see the connection, you will find the neutrophile has a slight evidence of doing the work. When you see those connections, the patient will find himself in a somewhat state of malaise; if you see no cells in which the connection is present, then the patient is not doing so well.

Dr. Tompkins (Nashville, Tenn.): I have to thank Dr. Durel and Dr. Bass for compliments that really belong to the foremost worker in this line, Dr. Sabin. It was she who developed the new technique, that is, the technique of the supra-vital staining of the blood, so that the work in tuberculosis took on a new lease of life. It was simply the old story of having worked the field out with the techniques at hand, so that a new one came into existence, it showed us new factors.

I think Dr. Durel has brought up a very interesting point, and that is, that actually all of the blood cells are involved in tuberculosis. What that means I think is hard to say; it probably represents the fact that there are many different factors involved and the blood picture is a complex of the responses to these factors. For instance, there is tissue destruction, there is protein, there is fat, and each cell is probably reacting to some special entity in the disease in the way.

In regard to the polynuclear cell, it is a very interesting thing that in the vital stains where we see the cell alive, the nucleus is practically never seen really divided; it will constrict itself and come together again, but it really is always one whole nucleus, and as the cell moves around, you can see the nucleus being whirled and twisted and pulled around with the cell, but it really always remains intact. That is true up to the time the cell disintegrates; at that time, the nucleus becomes swollen, and round, which shows it more definitely to be but one nucleus.

Then in regard to the lymphocyte: It is a very interesting fact that it always does decrease in the extreme stage of the disease. When you correlate that with the fact that people have general-

ly considered the lymphocyte a cause of resistance, and when you think of the fact that glandular tuberculosis is one of the most common forms of tuberculosis in children, where the lymphocytes are very high, and that the guinea pig, in which animal the lymphocytes are also high, is pecularily susceptible to tuberculosis it seems to me some other point of view in regard to the purpose of the lymphocyte should be considered. At present, we are regarding it, simply for the purpose of a new method of approach, from the point of view that it is an index of the resistance to the disease, and that some toxin, when it becomes prevalent enough, causes a decrease in the lymphocytes and the patient succumbs. That is, it is not a cause but an index of resistance, much in the same way that the anaemia in cancer is an index of failing resistance rather than the cause thereof, and is secondary to the progress of the cancer.

In regard to the third cell, the monocyte, that cell really represents what most people know as the large monocular and traeyitional cells. As the cell moves about the nucleus becomes horseshoe shape, but if you watch it in the vital preparations, in another minute or so the nucleus will become round; these two stages represent one and the same cell. It is believed that this cell may become the well known cell of tuberculosis, the epitheloid cell, that it may ingest but not digest the tubercle bacilli and, that it is an index of the extent of the disease and therefore, increases as the disease becomes worse.

Dr. W. H. Harris (New Orleans): Mr. Chairman, I believe the question of the response of the leukocytes on the part of the host invaded by the tubercle bacillus certainly does form a very interesting study. I think that, in conjunction with the circulatory cell study, the matter of the tissue lesions due to the tubercle bacillus deserves much consideration. We know, of course, that the lesion excited by the tubercle bacillus is particularly of the proliferative and not of the exudative type. The main peculiar formative cell of the tubercle, the so-called epithelioid cell has long been a conjectural cell as to its origin.

I believe the work of Winternitz, some years back, studying with the vital stain method the experimental lesion showed fairly conclusively that this cell was probably derived from the monocyte, to which Dr. Tompkins alludes. In that manner, we would expect that there should be, at times, some increase or prevalence of this cell in the circulating blood. We know, of course, that the circulatory cellular phenomena are merely a criterion to the lesion, that is to say, if for example we have a pneumonia with many neutrophilis in the lesion, we find that the blood shows a leukoytosis with many neutrophilis. We know also that in both experimental and human tuberculosis that the so-called lymphoid cells respond to a very great extent both locally and systemically. Earlier experiments upon the laboratory animal, wherein applications of roentgen-ray have been applied to the lymphioid structures such as spleen, lymph glands and so on, causing degenerative changes, that the resistance of the experimental animal to the invasion of the tubercle bacilli is greatly lowered, and the animal very quickly develops a lesion.

I feel satisfied that there is very much to be learned from the correlation of the histology and the blood findings, and I feel sure that the recent very promising work of Dr. Tompkins, Dr. Sabine and others will lead us toward some satisfactory conclusions.

Dr. W. J. Durel (closing): Mr. Chairman, if I understood Dr. Tompkins correctly, the observations made of the polynuclear neutrophile cells in blood films stained by the superavital technique, show that the nuclear lobes in the more matured cells seem to separate and reunite, and again separate and reunite as the cells move about in the fluid.

This is probably the most startling evidence I have received in twenty years of the absolute polynuclear nature of some polynuclear neutrophile cells.

That the neutrophile nucleus index is a fact and not a mistaken conception of cellular structure, I am convinced; because, I want somebody to tell me why—if I take a blood smear properly stained with Wright's stain, and I count one hundred neutrophiles in the upper or North margin of the film, I will have ninety cells or any other number of cells with a solid nucleus or nuclear lobes connected with isthmus hands. If I count a hundred cells (neutrophiles) in the lower or East or West side of the film, I will have the same number of on nucleus cells, or a variance in the percentage of neutrophiles with one nucleus, or connected nuclear lobes, of not more than two to four per cent.

If that is the case, the absolute separation of the lobes in the nuclear body is a certainty. Why shouldn't I get a different percentage—ten, fifty, or any other number upon each different count?

No, there is something definite in the neutrophile nucleus index, and I am glad to see that we are getting somewhere in clearing out this question.

I would ask Dr. Tompkins to tell Dr. Cunningham and his co-workers, not to omit the neutrophiles, and not to forget the value of the lymphocytes in their cytological studies. We owe a debt of gratitude to these tireless workers for drawing to our attention to the part played by the monocytes in tuberculosis.

Now, if I am wrong in my observations and conclusions relative to the neutrophile nucleus index, then, my whole work of twenty years is void, and all that I have carried out in the tuberculin treatment of tuberculosis is at fault. All my studies in the control of the dosage of tuberculin have not been constructively productive, and it would be left to me to return to the clinical method of giving tuberculin, or to abandon tuberculin therapy altogether.

Fortunately, I am positive that my observations and conclusions are absolutely correct. Why? Follow the neutrophile nucleus index in any case after a positive constitutional reaction to a subcutaneous dose of tuberculin. Such a patient will show a high (96 to 100) neutrophile nucleus index. This increase of cells with solid nucleus or nucleus with connected lobes persistently remains twenty-four, forty-eight, seventy-two hours, and in some very "active" cases two to four weeks. After such a time the neutrophile nucleus index returns to where it was before the tuberculin reaction.

Doctor, there is something to this. It shows that, not only the specific tuberculin protein eliminated from the body of the tubercle bacillus is active in its effects, but that it affects the different cellular elements of the blood in a separate way—acting and calling upon the multiple physiological properties of the blood cells, but not limiting itself to the monocytes and lymphocytes. Tuberculin is a direct stimulent to the function of the neutrophile cells.

I want to say this: All of us who refer to patients with tuberculosis should use the term tuberculous instead of tubercular. Tuberculin therapy has been my hobby for twenty years, and is still my hobby. In conclusion, since I happened to mention the neutrophile nucleus index relative to tuberculin therapy, remember that all individuals who harbor in their body tuberculous foci, or have for sometime tubercles that are not properly walled in by fibrous tissue, are constantly throwing into the blood circuit and body tissues, a variable amount of tuberculin-protein formed in the foci of infection.

The very fact that the neutrophile cells are the first to respond to the call for the protection of the body's tissues against invasion by the tubercle bacilli, has always been an interesting feature to me.

In the local reaction following the intracutaneous injection of tubercle solids, the local vesicular papule shows upon examination a great preponderance of neutrophile cells, and a small number of lymphocytes and monocytes.

I have repeated this test in the last few weeks to see if my previous observation was correct, and repeatedly found the neutrophile increased after a local reaction to the intracutaneous administration of tubercle solids.

That an inflammatory reaction takes place about the tuberculous foci when a constitutional reaction to tuberculin occurs, or when tuberculin-protein is absorbed from the lesions in the blood circuit (either from over exercise or other cause) is a very interesting clinical observation.

It is through such reactions to tuberculin that the tuberculous individual improves and gets well—because through the phagocytic power of the neutrophiles, we can but increase the healing of the tuberculous lesions.

The neutrophiles comprise your regular army corps, and are the first body cells to respond when new lesions are about to form. The lymphocytes form the reserve corps, and complete, with the action of the fixed tissue cells, the fibrosis necessary for a cure. The monocytes (according to personal observations) being also increased in number during the height of a tuberculin focal and constitutional reaction must play a part in the combat for supremacy between the tissue cells and the destructive effects of the tubercle bacilli.

Therefore, through some specific ferment, whether it be a fat ferment of the lymphocytes, or something else that stimulates the various blood cells in a different way, the work of neutralizing the tubercle poisons, and of the construction of destroyed tissue takes place chiefly through the action of the neutrophiles, with the secondary effect of the lymphocytes and other body cells.

Bear in mind that all tuberculous have in their body, tuberculous foci that are susceptible to reaction from tuberculin, and that these reactions when not too severe and too often repeated, are of great value in the cure of tuberculosis. Remember that all tuberculous eliminate tuberculin-protein from their lesions, and if these eventually get well after rest and well graduated exercise, it is because of the stimulating effect of the tuberculin-protein upon the blood and tissue elements of the body.

As for the use of cultural tuberculin in a very "active" case, or one already absorbing too much tuberculin-protein from his lesions, it is preposterous to believe that it can do any good. Such a patient is already having all the tuberculin-protein that he can handle, and the additional administration of tuberculin can but prove disastrous.

Place such a case under absolute and rigid rest until all signs of activity have disappeared, and give him the benefit of his own made tuberculin.

When the time comes that a patient does not form enough tuberculin-protein to keep up the stimulation of the neutrophiles, then, the administration of cultural tuberculin is advisable—the bacillus emulsion five milligrams of dry tubercle solids to each c.c. (Parke, Davis Co.) is used with good effect when the intervals of doses and increase of doses are guided by the fluctuation of the neutrophile nucleus index.

At the Charity Hospital we have had few opportunities and facilities to do this work, for we have not had the required assistance. Through the courtesy of Dr. Philip Jones we have carried on some few very interesting cases.

Finally, another fact that I would like Dr. Tompkins to think about, is "Why is it that, if I give a tuberculous patient a reactive dose of tuberculin today it will take from two to three weeks, in most cases, for the neutrophile nucleus index which has risen during the reaction, above ninety-four—to return to the previously low index present before the reaction?"

If this could be explained to me and made clear, I would be perfectly satisfied.

ENDOCRINE INFLUENCE ON GASTRIC SECRETION WITH SPECIAL REFERENCE TO HYPOTHYROIDISM.*

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The unknown has always been an inviting field for speculation and investigation by those with an inquisitive turn of mind, and probably no field of medicine is today the subject of more investigation or speculation than is that of endocrinology. The trend of opinion is reflected in one of the recent "best sellers" in which the hero in a fit of dejection trying to analyze himself says that "the appendix used to be the fashion. Now it is the glands. Everything depended on your endocrine system. He and Shelley had had the same headaches, because they had too much juice in them of one kind and not enough of another. Dreams, heart-throbs, logic, all a question of juices."(1) Any effect that endocrine glands may exert on the human mechanism is usually accomplished through the autonomic nervous system. According to Langley(2) this system is made up of two groups of nerves which he calls the para sympathetic and the sympathetic. More recent observers designate these groups from their anatomical associations as the bulbo-sacral autonomic and the thoracico-lumbar autonomic.

The diagram taken from Gaskell illustrates the different arrangements of the internuncial neurons of the voluntary and autonomic nervous system. "In both systems the afferent fibers terminate (by collaterals) around a cell of the gray matter of the cord. In the voluntary system this cell is situated in the posterior horn, and its axon travels to an anterior horn cell. In the autonomic system, this cell is located in the lateral horn, and its axon leaves the horn by the anterior root and travels by the white ramus into a sympathetic ganglion where it connects with a nerve cell whose axon forms the post-ganglionic fiber."

"The bulbar outflow consists of connector fibers lying chiefly in the vagus, but also in the third, seventh, ninth and eleventh cranial nerves. The sacral outflow consists of fibers leaving the cord with the second to fourth sacral nerves, which join to form a common nerve trunk (the pelvic nerve or nervus erigens) on each side. Because they have certain characteristics in common these two outflows are classed together as the bulbo-sacral division of the autonomic nervous system, by some referred to as the parasympathetic. The thoracico-lumbar outflow consists of connector fibers leaving the cord between the first thoracic and second or third lumbar segment. This outflow is sometimes called the sympathetic division of the autonomic nervous system."

Eppinger and Hess(3) believe that both these portions of the vegetative or involuntary nervous system are controlled by the endocrine system. The two groups of

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nerves are more or less antagonistic and by their combined action maintain the body in a state of tonus or equilibrium. Their action below the diaphragm is explained by Macleod as follows: "In the gastro-intestinal tract all parts cephalad of the ileocolic sphincter are innervated by the vagus and other cranial nerves, and are replaced below this point by the sacral outflow. At the same time the thoracico-lumbar outflow supplies this entire tract below the cardiac part of the stomach with fibers which act upon it in the opposite sense. The action of the bulbo-sacral outflow on the gastro-intestinal tract is excitatory except for the ileocolic and internal anal sphincters which are inhibited. It consequently favors the movement of food along the digestive tract and the secretion of the digestive fluids of the pancreas and salivary glands and the emptying of the gall bladder. The thoracico-lumbar outflow, on the other hand, tends to diminish the activities of the gastro-intestinal muscles and of the salivary glands and to close the sphincters of the lower tract."[4]

While definite knowledge concerning the complete mechanism of gastric secretion is lacking, enough is known to appreciate the governing influence of the autonomic system through the vagus distribution. The early work of Pavlov[5] demonstrated the control of the vagus over the psychic or appetite juice, sometimes referred to as the "ignition juice," so called because by producing partial digestion it serves to ignite the process of gastric secretion.

Popielski[6] has shown that after complete section of the vagi, secretion in the stomach continues and suggests that this is accomplished through the activity of the intrinsic nerve supply of the stomach, the plexuses of Auerback and Meissner. More recent work by Edkins,[7] Lim,[8] Luckhardt and Ivy,[9] however, show that the continued secretion is the result of a hormone-gastrin, which is formed as long as there is present in the stomach any half-digested food. Macleod states that the instant response noted in the production of the appetite juice indicates its nervous control, while "in the latter stages of gastric digestion, such promptitude in response on the part of the gland is no longer necessary, so that the slower, more continuous process of hormone control is sufficient."

This rather brief reference to the nervous control of the gastric secretion shows conclusively its dependance on the autonomic system. It is logical then to assume that disturbance in the autonomic system, referred to by Kessel and Hyman[10] as autonomic imbalance, would influence in varying degrees the gastric section. This balance or tonus in maintained, as previously stated, by an equalization of excitor and inhibitory factors, but no absolute knowledge is had as to just what constitutes there factors. Kessel and Hyman[11] consider an imbalance of the autonomic system as a diathesis which may be influenced by focal infections, psychic trauma or sex epochs. Notwithtsanding the statement referred to above of Eppinger and Hess[3] relative to the control of the autonomic nervous system by the endocrine glands, or the work of Asher and Flack[12] or Cannon and Levy,[13] who attempt to prove that thyroxin stimulates the autonomic system, Kessel and Hyman state that thyroxin is without effect on the involuntary nervous system and disclaim the proof of any scientific data showing that the ductless glands participate in any manner in the production of autonomic imbalance. They also state hormone therapy is without foundation and practically useless in this condition.

This confusion of theories and divergent views relative to the endocrine control of the autonomic nervous system is also manifest in a review of the literature on gastric secretion in certain definite endocrine diseases and especially so in the hypothyroid state.

CHART I.

HYPOTHYROIDISM (Lockwood)

Patient	Basal Metabolic Rate	Gastro-Intestinal Symptoms	Gastric Acidity	Roentgen-ray Findings
1	–13	Ulcer syndrome Constipation	F 25 T 35	Duodenal ulcer
2	–15	Constipation	F 0 T 37	Marked rectal and general colon stasis
3	–18	Moderate constipation Enteroptosis	F 0 T 18	Ptosis, cecum and transverse colon; cecal and rectal stasis
4	–18	None	F 20 T 40	Not done
5	–20	None	F 0 T 20	Not done
6	–28	Severe constipation right first quadrant	F 0 T 10	Cecal stasis—chronic appendicitis
7	–15	None	F 35 T 50	Not done
8	–18	Pain in lower abdomen, constipation, pelvic inflammatory disease	F 15 T 25	Cecal stasis; rectal stasis
9	–35	Constipation alternating with diarrhea mucus in stools at intervals	F 0 T 12	Negative
10	–15	Moderate constipation	F 0 T 35	General colonic stasis

Sturgis[14] reports an achylia in three of five cases of myxedema in which gastric analyses were made. One case showed a low acidity and the other a normal acidity. Lockwood's[15] results, (Chart I) show an achlorhydria in six out of the ten cases which he reported. Rehfuss[16] states that "the evidence is not sufficiently constant to warrant the assumption that this condition is accompanied by a definite change in gastric function, but what evidence there is would lead us to believe that the general tendency is toward a reduction in the gastric secretory output."

It is difficult to accept these conclusions in the light of the work by Katz,[17] who reported several cases of hyper-acidity in myxedema cured by thyroid administration, or the work of L. J. Hardt,[18] who fed thyroid to patients and noted a resultant depression of gastric secretion and acidity. Schnabel[19] reports some cases of achylia made worse with thyroid treatment.

There seems to be some unanimity of opinion regarding the occurrence of achlohydria in hyperthyroid states. Lockwood,[15] King,[20] Moll and Scott,[21] all reporting such findings in a majority of the cases studied by them. Sajous,[22] however, states that excessive thyroid secretion causes an increase of the gastric secretion with a hyperchlorhydria. Moll and Scott[21] advance four explanations for the occurrence of hypochlorhydria in Graves' disease. (1) "There is a constant tendency toward a subnormal or absent secretion of hydrochloric acid in Graves disease. (2) The secretion of hydrochloric acid in cases of toxic adenoma and puberty hyperplasia is usually normal or subnormal, but never absent. (3) There is a strong tendency to regurgitation of bile in Graves' disease. (4) The stomach empties rapidly in Graves' disease."

If we accept the conclusions of the above mentioned investigators, that hyperthyroid states are associated with a decreased

secretion of hydrochloric acid by the stomach the corollary conclusion would be that hypothyroid states are associated with an increased secretion of hydrochloric acid by the stomach. A tentative explanation for this hypothesis suggests itself that, if in hyperthyroid states there is a stimulation of the autonomic system as a whole resulting in a hypermotility of the gastro-intestinal tract and decreased hydrochloric acid secretion, in the opposite condition of myxedema we should naturally expect to find a slowing of muscular activity in the gastro-intestinal system and an increase in the secretion of hydrochloric acid.

That slowing of the muscular activity does occur in hypothyroid conditions is a common observation as evidenced by the chronic constipation which is a constant accompaniment of this condition. In the cases to be reported it is shown that an increase in the hydrochloric acid also occurs.

Macleod also explains that "innervation of the smooth muscles and glands is peculiar in that each effector may be acted upon by two neurons which affects its activity in opposite ways. Impulses from one neuron tend to increase the secretion of these glands, or augment the tone or degree of contraction of the smooth muscles, while impulses from the other neuron set up changes in the other direction which inhibit or depress these activities." It is also possible that in hyperthyroid states the secretory fibers in the vagus are depressed and in hypothyroid states they are excited. Certainly until more exact information is available we can only continue to theorize.

For an exact diagnosis of myxedema the basal metabolic rate is an all essential requirement. In well marked cases, however, the occurrence of a non-pitting edema with a dry, scaley alabaster-like skin, hair that is dry and brittle, with scanty public and axillary growth, slow pulse and a constant feeling of chilliness makes the diagnosis fairly certain without the aid of a basal metabolic determination.

Hertoghe[23] first called attention to the incomplete form of myxedema, more difficult of diagnosis, which he designated as chronic benign hypothyroidism. It is this type of case which is presenting itself in increasing numbers to us for diagnosis and treatment, complaining of a bizarre assortment of symptoms, prominent among which is the all embrasive term—dyspepsia.

If carefully examined these cases nearly always show some thinning of the eyebrows in the outer third, a dry or scaley skin, scanty pubic and axillary hair, a waxy color of the skin below the eyes with or without a real edema and a low basal metabolic rate and a marked susceptibility to cold. No single finding should be depended upon for a diagnosis and in the interpretation of the basal metabolic rate the patient's clinical signs and symptoms must be considered.

Our experience supports the statement of Dowden[24] "that in the period of time represented between the first injury to the thyroid function and the disease entity known as myxedema there must be a great diversity of symptoms and signs varying in degree as the thyroid changes progress."

Many cases are seen presenting few or many of the signs and symptoms referred to above in whom the basal metabolic rate is between a minus 10 and 15 per cent. By some observers these are considered normal readings but because of the association of other hypothyroid signs and symptoms and the happy result of thyroid therapy these cases are classed as mild or chronic benign hypothyroidism.

Chart II shows the results of our studies in a few of the cases observed. The basal metabolic rate varies from a minus 13 per cent to a minus 25 per cent, and in all except one case there is a more or less definite hyperacidity.

CHART II.

Patient	Basal Metabolic Rate	Gastric Acidity: Ewald Meal	Remarks
1	–18	F 22 T 38	Female—Age 30—Obese—Scanty Menstruation—No Resistance
2	–13	F 55 T 68	Female—Age 53—Post Menopause—Weak—Nervous
3	–22	F 40 T 68	Male—Age 47—Impotent
4	–22	F 56 T 81	Male—Age 42—Hyperacidity—X-ray Negative. M.
5	–25	F 54 T 93	Male—Age 19—Neurosis
6	–21	F 22 T 41	Female—Age 26—Ulcer Syndrome
7	–14	F 20 T 40	Female—Age 44—Indigestion
8	–20	F 67 T 98	Female—49—Renal Diabetes
9	–20	F 43 T 50	Female—Age 34—Obese—Irritable—Indigestion
10	–22	F 0 T 27	Female—Age 32—Icthyoid Skin—Early Menopause

Case 10 is included to show that occasionally we do observe some cases of achlorhydria in hypothyroidism. Case 4 is interesting because of his family history. His mother has had a nontoxic adenomatous goiter for years, and he has a daughter with an icthyroid type of skin. He has been a sufferer from hyperacidity for years, a fractional examination showing at one period of the test a free hydrochloric acid of 87 and a total acidity of 115. Roentgen-ray examinations have always been negative and there has been no symptoms present other than the hyperacidity.

Chart III is presented to show the results of thyroid medication in two cases of frank myxedema presenting a hyperacidity. While there is apparently no improvement in the basal rate of case 8, after treatment, there was a marked improvement in both signs and symptoms. This case was referred by a dermatologist for

CHART III.

CASES 8 AND 9 SHOWING EFFECT OF THYROID MEDICATION

Patient	Basal Metabolic Rate	Fractional Analysis Gastric Contents				
		Fasting	30 Minutes	60 Minutes	90 Minutes	
8	–20	F 26 T 118	F 67 T 98	F 17 T 87	F 22 T 50	Before Treatment
	–25	F 0 T 16	F 2 T 24	F 8 T 10	F 14 T 30	After Treatment
		Fasting		45 Minutes		
9	–20	F 49 T 71		F 43 T 50		Before Treatment
	–16	F 0 T 15		F 28 T 62		After Treatment

a general examination because of a dermatitis which resisted all treatment. Under thyroid extract this dermatitis disappeared with the improvement in her general symptoms.

Case 9 shows clearly the improvement in both acidity and basal metabolic rate. The chief complaint of this patient was a persistent vomiting occurring almost daily. This disappeared under treatment.

A comparison of Lockwood's findings, as shown in Chart I with Chart II of our series, accentuates the opposite results which we have obtained.

In summarizing we can state, (1) That there is no definite explanation of gastric secretion possible in the light of our present knowledge.

(2) The autonomic nervous system is most probably the controlling factor in gastric secretion.

(3) Because of the divergent views no definite conclusions can be determined as to the effect of autonomic imbalance on gastrict secretion.

(4) Cases of definite hypothyroidism have been observed with a hyperchlorhydria, and two cases are reported in whom the hyperchlorhydria was relieved by thyroid medication.

CONCLUSION.

To attempt to draw any conclusions after the study of only a few cases is obviously impossible, especially when we consider the other views referred to. However, from the observation of the cases reported together with a number not included in the report, the impression is gained that chronic benign hypothyroidism and myxedema are associated more frequently with an increase of hydrochloric acid in the gastric contents, than with a decrease, and under the usual medical treatment definite improvement in the gastric findings are obtained.

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DISCUSSION.

Dr. E. L. Eggleston (Battle Creek, Mich.): I do not know that I am competent to discuss gastric secretions from an endocrine standpoint. I was not impressed that the endocrines were a very great factor in disturbing the secretion. In the hyperthyroid states we very frequently have hypermotility of the gastro-intestinal tract and diarrhea is not an infrequent symptom. In hypothyroidism we are very apt to have constipation. In cases of achlorhydria, we frequently observe a hypermotility and sometimes a diarrhea. Judging from those analogies, we might think that in the hyperthyroid states we would expect an achlorhydria; in the hypo states where we have a constipation we might expect a hyperacidity. I am not certain that such conditions obtain. I am not sure, after listening to Dr. Levy's paper, that he has definitely concluded they obtain. Achlorhydria is a rather peculiar condition supposedly a congenital condition in the majority of cases; nevertheless, we do have it as a terminal finding in many of the wasting diseases; we have it also in gall bladder disturbances, particularly with cholelithiasis, whether a factor in the production of the gall stones or an effect, I do not think has been definitely determined. We have it in cases of primary anemia, and again in this condition we do not know whether it is a cause or an effect. Hurst

of London studied a considerable number of the relatives of primary anemia cases, and would conclude that it is rather a familial condition.

The paper of Dr. Levy has been very interesting and I am very glad indeed to have had the pleasure of listening to it, but I will say in conclusion that I am still of the opinion that the endocrines have no very great effect in producing hyperacidity, or, on the contrary, an achlorhydria.

Dr. Clyde Brooks (Tuscaloosa, Ala.): If you are short of discussion, I might offer a few words. I feel, as some of the other speakers, very inadequately prepared to discuss a paper of this kind. But I do appreciate the effort that Dr. Levy has made here, to associate the changes in gastric secretion with the endocrines. It seems that he has not definitely drawn his conclusion, but he points out the possibility that we may look for it.

The first piece of research which I tried to do, was a repetition of Professor Pawlow's work on the gastric fistula. Studying the secretion in this way brought out the importance of the psychic secretion; the "appetite juice," and so forth. Furthermore, I was working in the laboratory at the University of Chicago when Luckhardt and these other men performed these experiments on gastrin, I am very much impressed with the fact that gastrin seems to be a definite harmone which will stimulate gastric secretion. In other words, that seems pretty well established.

I am doubtful about the effect of the endocrines on the secretion of acid in the stomach. However, this paper has called our attention to this possibility, and we can be on the lookout for it, to see whether clinical experience agrees with this theory.

Dr. J. H. Musser (New Orleans): I appreciate very much indeed the opportunity of hearing Dr. Levy's paper. I want to thank him personally, very much indeed, for letting us hear this very interesting presentation of his.

The same thought occurred to me as occurred to the other discussors, as to whether it was the endocrines that were primarily disturbed, if they were responsible for this condition which he has described. I am free to confess I am a little dubious about it. However, I think it would be a very nice little experiment, sometime, Doctor, to work upon some dogs and see what happens, whether there is any distinct relationship between the two general systems.

Dr. Moise D. Levy (closing): I want to thank very much the gentlemen for discussing the paper, and I think a word of explanation should be had. The selection of the title of this paper would probably have been better, instead of "The Effect," the "Association of Endocrine Function on Gastric Section, with Special Reference to Hypothyroids." I am of the same opinion as expressed by Dr. Eggleston and Dr. Brooks and Dr. Musser, that there is no definite proof that the hypothroidism is the effect; or causes of this condition, but the fact the association was forced on my attention by the repeated occurrence of cases with these mild hypothyroid symptoms.

The suggestion Dr. Musser has made, as to the experimental work, is certainly one that, if possible, we will try to carry out. That requires rather an extensive scheme to carry through properly. Thank you very much.

THE USE OF FOOT-PRINTS AND FINGER-PRINTS AS IDENTITY RECORDS IN THE MATERNITY*

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NEW ORLEANS.

The maternity is compelled to employ some device to establish the association of each infant and mother. Natural parental feeling insists upon assurance that this device is infallible. It is self-evident that the hospital and its staff benefit jointly with parents and children in the protection afforded by an adequate method of identification of the new-born. The recent Cleveland episode illustrates forcefully how disturbing are the consequences of substitution or even suspected confusion of infants.

Different maternities follow varied practices in their effort to obviate disassociation. DeLee[7] outlines in detail the method finally adopted in the Chicago Lying-In Hospital, pointing out that its trustworthiness lies in the combination of several checks on identity. Among the records are included foot-prints of the infant, concerning which there is but little explanation. The present account, dealing solely with print-records, is presented with the thought that it may be of service to

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those who contemplate the introduction of revised methods. Attention is directed to the unique advantages of prints as supplementary aids in identification, and the technical aspect of their use is briefly discussed.

Reference should be made to DeLee's account for a discussion of the special problems of identification in the maternity. DeLee justly stresses the point that "perfect safety lies in making the operation of identification automatic and, as far as possible, independent of the necessity of human forethought". This principle should guide the organization of any method of identification, however its details may be elaborated. The following features may be noted as important requisites.

1. The method must be adapted to the conditions of the delivery room, so as to allow immediate record of the items distinguishing the association of the two identities.

2. It must provide some marks of identification which are constantly and readily accessible in the nursery, in order that the daily routine introduces no confusion of infants.

3. Its operation must be convincingly dependable, so that parents and staff are assured of correct identification. The proof of correctness must be available at any period during the stay in the maternity or thereafter, and fitted to serve as evidence in the event of litigation.

THE SPECIAL SERVICE OF FOOT-PRINTS AND FINGER-PRINTS.

Prints of the skin patterns, properly recorded, provide distinguishing marks which cannot be prejudiced by mischance in the procedure of identification. It is true that they fail to perform the entire service which is required by the regime of the maternity, for which other marks are necessary, such as attached tags, tapes, necklaces, etc. The baby's foot-prints and maternal finger-prints, as described below, are but supplementary to the use of these devices, the peculiar value of the prints being that they are available to validate or correct the operation of artificial signs.

It is well known that finger-prints, the impressions of the epidermal ridge configurations borne by the distal phalanges, are widely used in individual identification. Finger-prints owe their usefulness as marks of identity first of all to the infinite variety of the integumentary features. The epidermal ridges are fashioned into diverse patterns, and the total variation is tremendously increased by the occurrence of many variable features in the single ridges. So great is the variation that students of the subject do not hesitate to affirm that each finger-print is a unique specimen. Differences among individuals are correspondingly increased when one considers the entire series of finger-tip patterns. The characters in which variability is expressed are of proven permanence. Herschel carefully compared his own finger-prints made at the age of twenty-six years and at the age of eighty-three, without detecting any change in even the most minor detail. There are other similar comparisons in the literature which, though covering shorter periods of time, agree in demonstrating permanence.

The toes display patterns which are homologous to those of the fingers and of the same fundamental construction. For obvious reasons these patterns have not been exploited in individual identification. The palms and soles, however, are readily accessible for the making of prints. Their configurations of epidermal ridges, like finger-tip patterns, are highly variable. While direct proof is yet wanting, there is cause to believe that the palmar and plantar configurations are likewise unchanging. These has been, accordingly, considerable interest in these regions from the standpoint of use in identification. Foot-prints form the only feasible record in the case of the infant, owing to technical difficulties in making satisfactory impressions of the finger-tips and palms.

No benefit can be derived from the record of the infant's foot-prints unless the identifying signs attached to them are dependable. It is a common practice, apparently, to rely upon the inscription of the name, an identifying number and such data. But the record is greatly enhanced in value with the addition of the mother's finger-prints, as described by Robinson[2].

In the Maternity Department of St. Mary's Hospital (Detroit) it is the custom to add prints of the first three fingers of the mother's right hand to the foot-print card. This operation, if performed in the delivery room before there is any chance of confounding different mothers and infants, provides the most cogent association. It conforms precisely to the requisite of safety, being a simple mechanical performance which involves no forethought in the entering of identifying marks. Such a record, even lacking further additions, is a sufficient proof of the associated identities of mother and infant. The application of a name or number is simply a practical convenience. Should the occasion arise that the identity of an infant is questioned, perhaps through loss or illegibility of a tag, it is only necessary to compare newly-made prints of the mother and infant with those recorded at the birth. Even with complete confidence in the successful operation of attached identification marks, such as name or number, a check of their accuracy might well be introduced as a routine of discharge. If spaces are provided on the print-record sheet, the prints may be repeated at this time for comparison with the originals. There is thus incorporated in the permanent file a definite proof that each mother leaves the hospital with the child born to her.

Should the identity of an infant be made the object of legal issue, the parents contending a substitution in the maternity, no more convincing evidence for the defense could be presented than the infant-maternal prints. These prints, registered on a single card under conditions which make the association an automatic record, cannot be falsified. Readers interested in the legal status of prints as a means of personal identification should consult the compilation of illustrative cases by Taylor[3].

It must be emphasized again that the prints are only an adjunct to the ordinary means of associating the mother and infant. Their importance will increase or diminish in accordance with conditions in the maternity, depending upon population and the efficiency of other aids. In systems which are less well ordered than that described by DeLee, and even though the maternity be considerably smaller, the prints become increasingly serviceable, being at hand to establish the association when an error in the attributed marks is disclosed or suspected.

THE TECHNICAL ASPECT OF FOOT-PRINTS AND FINGER-PRINTS.

Attention may be first directed to the process of making the prints. Two requirements must be fulfilled. The necessity of immediate action has been mentioned; it is obvious that they must be obtained before the mother and infant are disassociated. Furthermore, the prints must be clearly decipherable. To secure satisfactory prints is by no means difficult, though the person to whom the duty is assigned should be practiced sufficiently to appreciate the desired standard. The following paragraphs outline the technique of printing and the materials required for the process. It will be noted that the necessary supplies are few and inexpensive and that the operation is simple.

Supplies—(1) A slab with a smooth, non-absorbent surface, such as a glazed tile, a piece of glass suitably mounted in a frame or a strip of sheet copper tacked perfectly flat to a baord. This slab is to be used to distribute ink in a thin, uniform film. For greatest convenience, its surface should be sufficiently large (e.g. about 6x10 inches) that the three prints made at each delivery may be made from a fresh ink surface, undisturbed by previous contacts. If the slab be of the suggested size the ink film spread prior to the delivery

requires no further manipulation. With too small a slab, the ink must be re-rolled after each contact to prepare a fresh surface for the next impression.

(2) A roller for distributing ink. The rubber rollers obtainable in photo-supply stores are satisfactory.

(3) A small supply of black mimeograph ink or printers' ink.

(4) Paper on which the prints are to be made. The clearest prints are obtained with a slightly glazed surface. It is preferable to provide printed forms with blanks for the insertion of name, sex, identification number, etc.

(5) A history-sheet clamp, with a smooth back against which the paper will be supported in printing.

Procedure—(1) Prints of both feet of the new-born infant are to be attached to the sheet, together with the four fingers of the mother's right hand (extended and printed all in one operation). There are, therefore, three impressions to be made, each according to the directions following.

(2) Spread a thin film of ink over the slab, rolling it until evenly distributed. A little practice will demonstrate the optimum quantity of ink. There should be just enough that the fine ridges of the skin appear distinctly in the prints. The danger lies more especially in the direction of applying too large a quantity, in which case the resulting print is lacking in the desired detail.

(3) Wipe the infant's soles clean and dry. Apply each one first to the ink film and then to the paper, using care to avoid dragging the inked surface against the paper. With the paper backed by a smooth, rigid support, and if the foot be placed directly upon it and then removed without dragging, the ridges will appear clean and sharp. It often happens that a second print, made without re-inking the sole, is superior to the first one, usually owing to an initial excessive amount of ink. There is no objection to adding duplicate impressions on the record sheet.

Hold the mother's right hand with the four fingers extended, and apply them to the ink film and paper with the same precautions to secure clear prints.

Wipe the ink slab and roller after each delivery; otherwise dust will adhere to the ink and impair the quality of subsequent prints.

Having prepared print-records, the next technical question involves their filing. In the most familiar application of finger-prints, that of the police bureaus, circumstances require an elaborate system of classifying and filing. By means of this system, a desired record may be located readily whenever necessary, for instance to determine whether an apprehended criminal has a prior record in the file. The classification and filing allow the location of the record or furnish proof of its absence on the impartial evidence of the finger-prints alone, independent of any reference to other physical traits, name or statements of the individual. Both Robinson and Montgomery insist that the prints of the maternity should be classified, as finger-prints are classified in police bureaus, and filed in accordance with this classification. Methods of classifying foot-prints have been devised, and if desired the classification may be employed for the filing of prints in natural sections. In this connection, I desire to correct an erroneous impression conveyed in two publications of Montgomery.[5,6] Montgomery assumes that my rather elaborate formulation of sole-prints[4], constructed as a descriptive record for certain detailed morphological studies, was designed as well to guide the classification of prints. The method is quite unsuited to this use, as Montgomery points out; its actual purpose is expressly stated in the original publication.

Notwithstanding the existence of practicable methods of classification, and contrary to the position taken by those who recommend adoption in the maternity, the

present writer sees no benefit to be gained from a classified filing. There are doubtless some maternity directors who are misled by the emphasis on a classified filing, being deterred from introducing print-records on the score that they entail a regulation identity bureau. As a matter of fact, a filing of the records in chronological sequence meets the only real demand of the maternity. The sole argument which may be advanced in favor of classifying the prints is that this arrangement provides for possible emergencies of future years, wherein the identity of the individual is in question, apart from any responsibility of the hospital. It is argued that the classified filing will assist in the identification of unknown persons. Hospital files cannot be generally serviceable in this regard unless they are maintained with the usual facilities of an identity bureau, including arrangements for co-ordination with other agencies. The hospital records may nevertheless prove to be of occasional importance in instances where it is desired only to verify an identification. In these instances the name of the individual, birth date and place of birth would be known or determinable. The print-records in such a case could be located in the files no less readily with a chronological filing than with elaborate classification.

To illustrate the comparative operation of classified and chronological filings let a case be assumed as follows. Mr. and Mrs. A appear at the hospital with an infant, contending that it is not their own, that a substitution was effected at Mrs. A's confinement, days, weeks or months previously. Prints are now made of Mrs. A's fingers and of the baby's feet for comparison with the original record. If the file is classified the next step is the classification of these new prints, to direct the location of the original prints in the file. If the file is arranged chronologically it is simply opened to the birth date of the A infant, when the print record is readily located by the name inscription. In either case the original and the new prints are carefully compared. If they are found to agree the identity is established beyond doubt. If, on the other hand, the prints of the disputed infant differ from those on Mrs. A's filed card, while Mrs. A's finger-prints agree, she was certainly tendered a baby other than her own. In a classified file the maternity of this baby will be disclosed by the data on the card bearing its prints, which are quickly located by the classification, while in a chronological file a brief search through the cards entered during the period of Mrs. A's stay will be necessary to find prints duplicating those of the baby in question. Regardless of whether the cards are classified or filed chronologically, the directions of search for Mrs. A's own baby are indicated only by the registries of babies with which confusion might have occurred. The search will be progressively narrowed by elimination, as prints of the infants are compared with those of Mrs. A's card. It is apparent, therefore, that classification of the prints does not facilitate the solution of cases of real or imagined confusion.

There remains one technical question regarding the print-record files, namely, that of the training which is necessary for competence in the comparison of prints. When reference to the prints is required some person who is familiar with the pattern details should be available to make the comparisons. A manual such as that of Wilder and Wentworth[1] forms a useful text for self-instruction; an intelligent and observant individual should be able to acquire a working knowledge of the subject through its study and practice with prints. Exceptional cases, especially those calling for testimony in court, may demand the service of an accepted expert. It may be mentioned that over four thousand banks have installed systems of finger-print identification. These systems recognize that relatively little training suffices to qualify the bank employee for their operation, which involves simply the direct comparison of prints as in the foregoing scheme suggested for the maternity.

SUMMARY.

(1) Sole-prints of the infant and finger-prints of the mother form an invaluable supplement to the usual aids in associating mother and child in the materity. Being registered on the same sheet before the two are disassociated, the operation of identifying tags or other devices may be checked at any time, and as an absolute guaranty the prints may be repeated and compared with the originals when the mother and child are removed from the hospital.

(2) The making of prints is simple and not time-consuming.

(3) A filing of the prints in chronological sequence satisfies any need for reference. It is unnecessary to classify these records otherwise (as finger-prints are classified in police bureaus).

(4) The ordinary operation of the system does not require the service of a trained "finger-print expert".

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A MONUMENT TO MEDICINE—Dr. Samuel W. Lambert, in his address at the dedication of the Medical Center, described this monumental group of tall buildings as "a veritable Tower of Babel"—in view of the variety of scientific languages to be spoken there. Its significance, as was again emphasized at the dedication, is that it is devoted to the "trinity of medicine": the care of the sick, research and teaching. This is not by any means unique, but never before have the three services been co-ordinated in one institution on such a scale and with such endowment and equipment. Even so, it is not as yet complete, and will not be till every specialty of medicine and surgery has not only its dispensary but also its wards for the care of patients, and until provision is also made for dormitories and a common dining-hall for the students of medicine.—Quoted from Science, 68:380, 1928.

THE TREATMENT OF VARICOSE VEINS BY INJECTIONS OF SCLEROSING SOLUTIONS*

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A non-surgical method of treatment of varicosities of the lower extremities is desirable because (1) of the resulting disability, especially among the laboring classes; (2) of the loss of time incident to hospitalization in cases in which surgical treatment is instituted. With this idea in view we were prompted to make a study of the injection treatment. After convincing ourselves of its value we adopted the method in the treatment of our cases in the clinic at Charity Hospital and, later, in private cases.

In 1858 Chassaignac used iron perchloride in three minimum doses to obliterate varicose veins. While satisfactory results were obtained in some instances, the method soon fell into disrepute by the unpleasant complications. Other pioneers were Vallette, who in 1875 used a solution of iodine and tannic acid with some success; Tavel, who in 1904 recommended the use of five per cent phenol; Borcherd, who in 1910 used arsenical preparations on the assumption that all varicosities were luetic.

Credit for bringing this new treatment before the profession on a practical basis is given chiefly to the French. The names of Sicard, Gaugier, and Genevrier are preeminent. Forestier and Douthwaite must also be given much credit for their work.

The etiology of varices, or phlebectasis of the lower extremities, is varied, and often no one well defined cause can be found. Ashurst[1] suggests gravity as an

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important factor; McPheeter[2] explains them on an obstructive basis:

(a) As tight bands, most commonly at the knee;

(b) Mechanical interference with the returned flow of blood in the pelvis from pregnancy, constipation, tumors, etc.

Occupation apparently plays an important role, as varicose veins are more frequent in individuals who remain on their feet for long periods each day, as barbers, waiters, store clerks, motormen, and the like. Heredity, endocrine dysfunction, and the existence of a varicose diathesis have been considered.

The pathology in these dilated tortuous veins is found in their walls. Here there is a weakening from the degeneration of the fibrous and muscular tissue; a thinning of the walls, and at time some sclerotic patches. The increased tension on the nerve terminals in the skin from these large veins probably causes the pain which these patients experience, and forces them to seek treatment.

While normally the flow of venous blood in the leg is from the superficial to the deep veins, in varicose conditions there is a reversal of this flow, due to incompetency of the valves in the communicating branches between these sets of veins. Jentzer, using the radiograph and injecting strontium bromide, and Magnus, by means of a hemodrometer, have shown that when the leg is in a vertical position or is raised to an angle of 45 degrees the flow of blood in the superficial veins is centrifugal; and when the leg is horizontal the flow is either stationery or that toward the heart is slower than a centrifugal stream when the leg is vertical (Forestier). The valves in the communicating veins being incompetent, the blood now flows from the deep to the superficial veins. Magnus has also shown that there is a reversal of blood flow in the skin capillaries of the leg. This leaves the extremity with a very abnormal circulation, as evidenced by tracing the course of blood centrifugally in the superficial veins being supplemented throughout its course by blood coming from the deep veins and passing through incompetent valves, reaching the deep veins in the foot, either through skin capillaries or through the communcating veins, and that which reaches the level of the fossa ovalis may return again to the superficial circulation. The result of this is that the nutrition of the skin and superficial structures of the leg is greatly impaired, and its resistance to any sort of pathological process is low.

Numerous solutions have been advocated for the use as sclerosing agents:

1. Sodium salycilate in 20, 30, and 40 per cent concentration used extensively by Sicard, Paraf, and Forestier.

2. Mercuric chloride in 1 per cent solution.

3. Calorose and invert sugar preparation is recommended by McPheeter.

4. Red mercuric iodide, used by Montpelier and LaCroix.

5. Alcohol has been used but has nothing to recommend it.

6. Sodium chloride, 10 per cent, and sodium salycilate, 25 per cent, equal parts of each solution, used by Maignot and Carlton.

7. Glucose, in 50 to 60 per cent concentrations, are very thick solutions and very difficult to inject through small bore needle.

8. Grape sugar in highly concentrated solutions is used by Nobel, of Vienna.

9. Sodium chloride in 20 per cent solution, and used in 5 to 10 cc. amounts at each site of injection, is recommended by McPheeter, especially for use in larger veins.

10. Quinin urethan, advocated by Genevrier in the following solutions: Quinin

hydrochloride 4 grams, urethan 2 grams, distilled water 30 cc. (provided in ampules by Park-Davis & Co.).

The solutions which seem to answer all the requirements after being used and reported by various workers in many thousands of cases were sodium salycilate in 20, 30 and 40 per cent concentrations and quinin urethan solution. As these solutions seem to have much to recommend them, we used them exclusively in our work.

Sodium salycilate in 20 per cent strength was employed in the first few cases without success. Following this, we employed 30 and 40 per cent strength, using 2 to 4 cc. at site of each injection and making only three to four injections at one treatment with satisfactory results in every instance. This solution is probably the most efficient for use in the larger veins. The only objection to its use is the seere cramp that it produces at the time of injection. However, this seems to be of no consequence, except in patients with neurotic tendencies, as the cramp never lasts more than one or two minutes and, as a rule, only a few seconds. It is a fairly severe cramp which seems to follow the course of the vein downward and is occasionally experienced in the region of the fossa ovalis.

Quinin urethan solution was used in our later cases, and we consider this the method of choice. It does not produce any cramps or pain at the time of injection. It is very efficient, responding in every case, and is used in small doses, ¼ to ½ cc. being used at each site of injection, and no more than 2 cc.'s being injected at one sitting. The injections are repeated at three or four day intervals until all veins become thrombosed. The number of injections and the duration of treatment depends entirely upon the extent of the varicosities. In four of our cases only one injection was required. A few extensive cases required from 12 to 24 injections. In our series of 17 completed cases we have had no failures to date and no serious complications. One patient complained of a severe chill which lasted for about one hour, following quinin urethan injection. We have had some swelling of the leg following treatment, but this has always subsided in a short time. Ecchymosis at the site of injection occurred in several instances, but was of no consequence. In several cases we obtained small superficial sloughs at the site of injection, but these have never been sufficient to cause the least discomfort to the patient or to alarm us. Some degree of perivenitis probably occurs in every case, and at times it is severe enough to cause complaint of pain, tenderness over the vein, with reddening along its course. Such cases are not frequent, and rarely last more than 7 to 10 days.

The only instruments necessary are. any type of good syringe, 5 cc. capacity for salycilate, and 2 cc. for quinin urethan, and a suitable needle. The needle we found satisfactory was a steel, short bevelled, 25 or 26 guage, 2.5 cms. in length.

There is some question as to the best position of the patient at the time of injection and as to the use of a tourniquet. Douthwaite suggests the use of a tourniquet to facilitate the puncture of a vein. Sicard, Miller, Thornhill, and others insert the needle into the lumen of the vein while the patient is either sitting or standing. They then have him assume a reclining position and inject the fluid. Their reason for this is twofold: (a) There is less blood in the vein when the leg is in the horizontal plane; (b) Sicard has shown that when the leg is horizontal fluid injected into the superficial veins shows no disposition to flow to the deeper veins but tends to remain localized in the vicinity of the injection. In spite of the practical inference that must be drawn from Sicard's work the result of the cases that we have had show the position of the patient to be a matter of indifference. From our experience the position which affords the most comfort to the patient and to the operator,

and at the same time leaves the vein dilated enough for an easy puncture, is the best position.

After placing the patient in the desired position, the actual process of injection consists of: (a) Cleaning the site of puncture with alcohol or some other colorless antiseptic; (b) inserting the needle into the lumen of the vein. (Our results indicate that it makes no difference whether the vein is punctured directly or after the needle has traversed a few millimeters of skin and subcutaneous tissue); (c) make suction by withdrawing the piston to determine if the point of the needle is in the lumen of the vein and when blood is drawn into the barrel of the syringe the next step may be taken; (d) inject the solution slowly, stopping occasionally, *e. g.*, after the injection of each 1 cc. to check the position of the point of the needle. A careful watch should be kept for signs of edema and swelling of the tissues around the site of injection. If, at any time, there is any doubt whether the needle is in the vein, stop the injection; (e) leave the needle in the vein for a few seconds after completing the injection, then withdraw it; (f) with a piece of gauze, exert firm digital pressure over the puncture site for one minute, then have the patient continue this pressure for two or three minutes longer; the site of puncture may or may not be dressed, according to preference; (h) have the patient remain quiet for five minutes after injection and then allow him to do as he pleases (Thornhill). *No* instructions are necessary except to notify the patient when to return.

The injections should begin in the more distal portion of the limb and proceed toward its proximal end. This allows for the reverse direction of blood flow; the first injections do not interfere with the succeeding ones. Douthwaite thinks it not necessary to inject above the middle of the thigh, since there are usually no symptoms in areas above this. He has, however, injected as high as the saphenous opening without untoward results. Other authorities (Payne),[13] inject the whole of the saphenous tract to within four centimeters of the fossa ovalis.

The immediate reaction depends, as previously mentioned, on the solution used. With the sodium salicylate solution there is an accompanied cramp; with the quinin-urethan solution there is none. With the injection of either solution there may appear a momentary constriction of the vessel injected, but this is only temporary and has not bearing on the final results of the treatment.

In twenty-eight to thirty-six hours the varix may be felt as a hard cord at the site of injection and for a variable distance of eight to sixteen centimeters along the vein. There may also be a slight reddening along the course of the vein accompanied by some tenderness on palpation that ordinarily disappears within a short time. At the end of a week the pains from the varicosities are entirely gone. The disappearance of pain is a progressive affair, and often can be noticed on the second or third day of the treatment, becoming less intense each day until it is no longer felt. On the fourth to the sixth day the thrombosed vessels are slightly less prominent than before treatment and often disappear within two weeks and may be felt as small hard cords running beneath the skin. There are some cases which require a longer time for the veins to disappear, but few of these require more than two months. During the entire course of treatment the patient is encouraged to walk about and is at liberty to attend to his or her work.

The action of the sclerosing solutions on the varicose veins has been given various terms. Sicard and Forestier emphasize that the reaction is essentially a "venitis" as being localized, generating a very adhesive clot, which does not give rise to pain or edema of the extremity, leaves an atrophied cord, and has positively no ten-

dency to give rise to emboli. Phlebitis is defined as causing pain with a frequent extension from the superficial network to the deep lying network, causing edema of the extremity, the clot formed is often loose and afloat in the blood in the dilated cavity, atrophy does not take place, and the veins remain hard and bulky. Further attacks of infection are possible which may give rise to emboli. Sir Sidney Alexander[14] describes the same process as a "chemosis of the intima that suggests acute congestion of the vein that may be sufficient to cause the opposing intima to come together and obliterate the vein." Others writers term the process a phlebitis, as all the coats of the vein are penetrated by the fluids, as shown radiologically by Sicard and Gaugler. The greatest response is obtained from the intima, for here there is a hyperplasia of the endothelial cells with approximation of the adjacent walls. Secondary to this, a thrombus is formed and is characterized by being very hard, tenacious, adhering very closely to the walls of the vessel, and anchored to these walls by a firm network of fibrous tissue that permeates the thrombus and is attached to the entire circumference of the inner coat of the vein; it is not infected; shows no tendency to break up and form emboli, and organizes very quickly.

Marked cardiac or renal diseases, edema of the leg, old feeble patients, collateral varices, pregnancy, and recent varicose phlebitis have been mentioned as contraindications to this method of treatment, and with these we concur. Only under exceptional circumstances do we advise this treatment during pregnancy.

The greatest objection to this treatment is the possibility of the occurrence of embolism. It is, certainly, a theoretical possibility, but, as Dr. E. T. Bell, Professor of Pathology at the University of Minnesota, expresses it, "There is no amount of experimental work that can rule out theoretical possibility of embolism, but the practical clinical evidence of large numbers of cases injected at home and abroad with thousands of injections having been made and only one fatality from embolism, is sufficient evidence to outweigh the theoretical possibility." (McPheeter, 1927.) Not a single fatality has been reported following the use of either sodium salycilate or the quinin-urethan solutions. Olson reports a fatality following the injection of calarose, and Lomholt (Forestier) one that followed the use of sodium chloride. McPheeter (Oct., 1928) collected from the literature seven fatalities that are attributed to the use of sclerosing solution.

The injection treatment has many advantages over surgical excision in that: (a) It requires no anesthetic and the discomfort that follows the use of an anesthetic; (b) the injection method is anbulatory and does not take the patient away from his or her work, while the excision of the veins requires complete disability for a period of several weeks; (c) the pain from the introduction of the needle is all that is experienced, other than the cramp with the injection of sodium salicylate, and this is surely less than that experienced by the dressing of the wound and removal of the sutures; (d) even a slight scar left from excision may be objectionable in some women who have their varices removed for cosmetic effect—injections leave no scars; (e) the injections are far less expensive than the cost of excision; (f) recurrence may be easily treated with a few more injections.

CONCLUSIONS.

(1) Obliteration of varicose veins of the lower extremity by the use of intravenous sclerosing solutions has proven highly satisfactory. The solutions of choice, we believe, are quinin, urethan and sodium salicylate.

(2) The reaction of the vein is essentially that of an aseptic inflammation caused by chemicals, and followed by the formation of a thrombus that obliterates the vein, and is characterized by the fact

that it shows no tendency to break up and form emboli and that it organizes quickly.

(3) There is no loss of time from work as the entire treatment is ambulatory and the procedure is relatively painless.

(4) Relief is prompt, and progressive with a return of the normal contour of the diseased leg without any traces of previos vuarices.

(5) Varicose ulcers and varicose eczema respond to this in conjunction with local treatment.

(6) Recurrences are not more frequent than that following excision and such cases are easier handled with the injections.

(7) The treatment improves the circulation in the legs without incapacitating the patient in any manner.

(8) There is no record of embolism having occurred following the use of the solutions advocated by the writers.

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DISCUSSION.

Dr. Earl Garside: The authors have so admirably handled this subject that there seems little to add. I am glad to note their attitude is that, although the injection treatment of varicose veins is not extremely difficult, there is, however, an element of danger in it, and in common with many other worthy procedures in the realm of surgery, it is not "fool-proof."

Unfortunately, I have had no experience in the use of quinin hydrochloride and urethan solution, which is apparently the authors' choice of solutions. It seems to have all the advantages of the others and none of the disadvantages. In my first cases I used 15 per cent to 20 per cent sodium chloride solution, and had no bad results. After using it for about two months I learned of McPheeters' experience of slough following its use. Knowing of Forestier's work I began the use of 20 per cent to 30 per cent sodium salicylate solution, which gave excellent results. A few patients complained of slight cramp, but in none was it sufficient to cause much concern. I was hesitant to try other solutions of which I knew less. The glucose solution is difficult to inject, and forms a friable clot, necessitating the wearing of a bandage to compress the intima of the veins to facilitate sclerosis. The mercuric solutions are known to be toxic, and may be so caustic as to form sloughs.

By way of emphasis, may I repeat some of the authors' contraindications. Certainly injection should be avoided in veins recently the site of a phlebitis. To proceed under these circumstances is to invite disaster from infection and septic emboli. The phlebitis seen about chronic ulcers is not a contraindication, however. Of course sclerosing the superficial veins should not be done when the deep veins are not competent to assume all the responsibility of venous circulation of the extremity.

Undoubtedly the injection treatment of various veins has passed the experimental stage and has earned its place among recognized therapeutics.

NEUROLOGY AND THE EAR.

GILBERT C. ANDERSON, M. D.,

NEW ORLEANS.

The eighth pair of cranial nerves consists both functionally and anatomically of two distinct nerves subserving hearing and equilibrium, or spatial orientation. A third component, the intermediate nerve of Wrisberg, travels for a distance with the eighth but it is not concerned with the function of the eighth. While the auditory branch, or, rather, portion, of the eighth is the sole mediator of hearing, the vestibular branch is reinforced in its function of maintaining equilibrium by other factors as the deep sensations from the joints, tendons and muscles, by touch, by vision, and possibly somewhat by hearing.

The cochlear nerve originates in the spiral ganglion of the cochlear, the cells are bipolar, the periphereal branches running to cells in the organ of Corti, the centrally directed branches passing to the ventral and dorsal nuclei of the auditory nerve. The fibres then pass to the trapezoid body and the superior olive, most of them crossing but some remaining homolateral, then by way of the lateral fillet to the internal geniculate and the inferior corpra quadragemini, then sweeping through the posterior portion of the sensory part of the internal capsule they reach the cortical centers of hearing in the superior temporal gyrus. As some of the fibres are not crossed hearing has a bilateral cortical representation.

The vestibular nerve begins in the ganglion vestibulare, or Scarpa's ganglion. These cells are also bipolar and the peripherelly directed fibres pass to the recep-

tors in the semicircular canals, the utricle and the saccule. The centrally directed fibres enter the brain stem where they divide, some passing downward to the vestibular nucleus while ascending fibres reach the medial, lateral and superior nuclei. A few fibres pass directly to the cerebellar cortex. A bundle of fibres from the vestibular nucleus descends the cord as the vestibulo-spinal tract to end about the anterior horn cells, effecting the muscles by way of the axones of these cells or the final common pathway. The ascending fibres from the nuclei are directed upward in the posterior longitudinal bundle to terminate about the cells of the oculomotor nuclei bringing the vestibular function into synergic action with the oculomotor muscles. It is also quite probable that some fibres are connected with the vagus.

Clinically the two portions of the nerve are generally effected in periphereal lesions while there may be an entirely disassociated interference with function in central lesions. It is however to be borne in mind that hearing can be entirely abolished by a central lesion which is bilateral because of its bilateral cortical representation.

The seventh nerve, owing to its juxtaposition, is frequently effected along with the eighth, especially in cerebello-pontine angle lesions, but the eighth may be effected much sooner than the seventh because the seventh is firmer and denser. One might assume that such a lesion which will effect the seventh will almost surely effect the eighth also, whereas a lesion effecting the eighth may spare the seventh for a long time. An example is a tumor of the eighth nerve which, when it effects the seventh, generally does so rather late.

Lesions of the eighth nerve naturally manifest themselves by interference with its function resulting in tinnitus, deafness and vertigo. While it is true that most lesions of the nerve will affect both portions, certain toxic substances seem to exercise a selective action upon one or the other, as vertigo from alcohol and tobacco and tinnitus and even deafness from quinine and salicylates. Vestibular disturbances affect the vagus far more decidedly than do those of the auditory apparatus, as witness the nausea and vomiting so frequently associated with vertigo and viceversa. Tinnitus is a noise in the ear and may vary from a very indistinct and highpitched hum to a roaring, rending, breaking or cracking sound either continuous or intermittent. It is often an early symptom and may occur months or years before any diminution of hearing is noticed. During such a period it may be more or less continuous or it may exist for a time and then cease altogether to be forgotten and recalled only with difficulty when other symptoms bring the patient for consultation. It will disappear with the onset of deafness. Some patients with impaired hearing will recall tinnitus as having existed a long time before only after diligent questioning. The symptom is present in lesions of all degrees of severity ranging from intracranial tumors to inspissated cerumen; among other conditions in which it occurs one might mention meningitis or other diseases of the base of the brain, epleptic aura, migraine, uremia, arterio-sclerosis, labyrinthritis, perforation of the tympanic membrane, aneurisms, anemia, Eustachian occlusion, otosclerosis, toxic conditions from acute infections or drug, and last but not least, hysteria. Tinnitus as a symptom should always receive a good deal of respect and be investigated with the utmost care. The treatment is, of course, the treatment of the underlying cause, presuming this can be found.

In every case of impaired hearing it is desirable to learn if the deafness is of the nerve or endorgan type. Much can of course be learned by comparing air conduction with bone conduction after the method of Rinne. Normally air conduction is greater than bone conduction, but in disease of the endorgan the formula is reversed. The technic of the test is familiar to all, but it might be mentioned in passing that to definitely localize bone conduction

to one side a noise apparatus should be used in the opposite ear. A lesion of the temporal lobe or a lesion which effects the temporal lobe may cause unilateral deafness, or, if bilateral, a complete deafness. Such lesions are rare, but bilateral deafness is common in Schilder's disease or encephalitis periaxalis diffusa, the lesion generally starts in the occipital region and the cases might go first to an ophthalmologist but as the lesion advances forward the temporal lobes will be involved and bilateral deafness will occur. Lesions effecting the first temporal convolution may cause word deafness in which the patient clearly hears all sounds but does not interpret word sounds as they have lost their association. In lesions of the posterior limb of the internal capsule deafness occurs on the side of the hemianesthesia which is the contralateral side of the body owing to the decussation of the fibres. Hyterical deafness is generally unilateral and usually there is present some other factor to arouse the examiner's suspicion; it is sometimes associated with hysterical hemianesthesia, not necessarily on the same side.

The eighth nerve is probably the site of new growths more frequently than any other cranial nerve. These growths are mostly neurofibromata which are histologically benign but clinically malignant, as they can, and frequently do, cause death. They can exhibit a wide variety of signs and symptoms, according to their size, for when they reach a considerable growth they affect not only the eighth but the sixth and seventh nerves directly. They may also push toward the midline and crowd the pons and medulla toward the opposite side. Such pressure will affect the lower cranial nerves, the peduncles, the tracts passing through the pons, occlude the aqueduct of Sylvius, causing an internal hydrocephalus, and may finally embarrass the vital medullary centers. This might occur either through direct pressure or by increase in the general intracranial pressure. The writer has seen two cases in which the brain stem was markedly displaced by tremendous acoustic tumors. These tumors have a very slow growth and may be present for a number of years before the patient comes for relief. Generally the diagnosis presents less difficulty than that of many other intracranial lesions. Roentgenologic technic has been developed which often shows erosion of the internal auditory meatus. A tumor in the cerebello-pontine angle, other than an acusticus, may prove confusing but the treatment is the same. Posterior fossa tumors in general may effect the eighth nerve. Tabes dorsalis commonly affects the eighth nerve; probably as frequently as it does the second, and in a similar manner, although sometimes the site of the process is in the ear; the deafness is generally very slowly progressive but it may develop swiftly; it is usually bilateral but may be more marked on one side. Tabetics are also subject to tinnitus and vertigo which may be severe enough to cause vomiting and prostration.

The function of the semicircular canals is spatial orientation; a disturbance of this function is characterized by vertigo, commonly called "dizziness" or "swimming of the head;" equilibrium may be entirely upset by vertigo. Vertigo is essentially a vestibular dysfunction although the primary or exciting cause may be in some part distantly removed from the ear. This is particularly true in gastro-intestinal disorders, diseases of the biliary apparatus and any of the multiplicity of disturbances to which the female pelvis is heir. It is frequently associated with headaches, especially migraine, and accompanies imbalances of the oculomotor muscles or even eye fatigue; it may be induced by gazing at rapidly moving objects when riding on a train, and even by nystagmus; it is the prime factor in seasickness and car sickness. Text books and outlines for neurologic examinations frequently separate vertigo into objective and subjective; objective when the outer world seems to spin around the

patient and subjective when the patient seems to spin upon his own axis in a stationary world. In the application of this principle one is apt to find that only rarely will a patient be able to tell whether himself or the outer world has been spinning. Some have thought that an intracerebellar lesion will cause objective vertigo away from the side of the lesion and an extra cerebellar lesion toward the same side. The most striking vertiginous syndrome is that described by Meniere as being due to an effusion of blood into the canals—some of the cases do have such hemorrhages but not all. The vertigo is so intense that the subject is struck down as if by an axe, perspiration is profuse, there is nausea and vomiting and even consciousness may be lost for a time; it is often accompanied by tinnitus and deafness, the deafness may be complete and last for some time. Occasionally there are premonitory symptoms as a slight vertigo or tinnitus. An examination of the ear will show the tympanic membrane and Eustachian tube normal. The condition is someimes confused with gastro-intestinal upsets, epilepsy, apoplexy, or brain tumor. The attacks may last hours or days and may occur at frequent or long intervals, recovery from the acute attack is the rule, but the vertigo is apt to remain. Vertigo is rare in childhood but becomes more common as age advances and men are more often affected than women. Arterio sclerosis, hypertension, nephritis, gout and rheumatism are often present in elderly subjects given to vertigo; tinnitus and impairment of hearing are common accompaniments as might be assumed from the structure of the eighth nerve. Vertigo is a prominent symptom of a rare and obscure disease known as paralyzing vertigo or Gerlier's disease. It has not been reported in this country so far as the writer knows, seems to attack strong and healthy people and has a tendency toward families; it occurs in the summer, there is a sudden onset of vertigo with pain in the neck, interference with vision and marked muscular weakness even to the point of prostration. The attacks lasts only a few minutes but may occur with great frequney over a period of years and then disappear. The Barany tests are par excellence for vestibular function; the technic need not be described.

Neuralgia of the ninth nerve may first come to the ear, nose and throat specialist, as the pain is in the throat but radiates to the ear. This is not a common condition but it is very characteristic and striking; it is apparently a major neuralgia of the ninth nerve exactly analogous to the tic doulereaux of the fifth nerve. The pain is of the same sudden, lightning-like, lancinating character and of momentary duration. It is located along the lateral wall of the upper oropharynx in the region of the tonsil and anterior pillar and at the base of the tongue, it radiates to the ear on the same side. There are trigger zones as in trifacial neuralgia and the pain is brought on by eating, drinking, especially cold liquids, talking, etc. The patients are completely disabled and describe the pain as intolerable. The pain may be temporarily abolished by cocainization of the trigger zone but is permanently relieved by section of the ninth nerve, and as this section should be made proximal to the ganglion, it must be done intracranially.

Chronic purulent otitis media, mastoid inflammation and occasionally acute purulent otitis media may result in intracranial complications, as the roof of the antrum or tympanum is liable to perforation. We may encounter sinus thrombosis, brain abscess, intra or extradural, or meningitis. The neurologist is seldom called in sinus thrombosis but may be consulted in abscess or meningitis. Extradural abscess may be just above the tympanic roof or about the sigmoid sinus and may be suspected when the discharge becomes less or disappears and the patient shows signs of meningeal irritation. Extradural abscesses are more common than subdural, the dura being a tremendous barrier. The subdural ab-

scesses are in the temporal lobe or the cerebellum—more commonly the former. The temporal type lend themselves more readily to drainage as the intracranial pressure tends to keep the cortex pushed up against the opening and so occlude the subarachnoid space, but in the posterior fossa with its large cisterns there is more chance for the infection to spread. It is probable that many small extradural abscesses become localized and heal spontaneously, and while the same thing may happen to a small intradural abscess it seems far less likely. An intradural abscess may become localized and exist for a long time to suddenly burst and result in a rapid death.

A patient who has had a chronic ear or mastoid disease may complain of headache, which is the earliest and most common symptom; the headache is apt to persits and may be of moderate or the most extreme severity; he will also report a chilly sensation, not a real shaking chill; there is a feeling of general malaise but no marked prostration. Vomiting is the rule and it is frequently spontaneous—that is, not associated with meals or nausea yet hardly of a true projectile type. Projectile vomiting occurs when the intracranial pressure is increased. Temperature and leukocytosis may or may not be of help—not too much dependance can be placed upon them as the temperature may be subnormal, normal or elevated; percussion tenderness may be elicited over the site of the encephalitis and the patient will most likely be irritable and fussy.

A picture of this kind points very strongly toward intracranial invasion in an early stage. As the invasion progresses more positive signs appear, there is more definite evidence of meningeal irritation and the spinal fluid should now show a great increase in cell count with many polymorphonuclear leukocytes. If abscess forms in the tempero-sphenoidal lobe there may be one or more convulsion; a homonomous hemianopsia is of great localizing significance, this may be for colors only and it may be transitory, but do not be misled if it is present one day and absent the next. Aphasia in a right handed individual in whom a tempero-sphenoidal abscess is suspected on the left side is about as definitely diagnostic as one could ask. Motor paralysis may develop; the first muscles affected are generally those of the face, the cortical centers being low down in the precentral region. Such a paralysis is, of course, cortical in type, which is to say, it involves the lower portion, the upper having a bilateral cortical representation. Much later there may be paresis of the arm and leg, seldom a frank hemiplegia.

An infratentorial abscess will naturally give signs of cerebellar involvement in addition to the general signs of brain invasion. There is occiptal tenderness and pain, cervical pain with rigidity; the head may be tilted to one side, usually the side of the lesion, ataxia, incoordination, asynergia, past pointing, dysdiadokokinesis, cerebellar rebound, nystagmus, ocular palsies, conjugate deviation and loss of corneal reflex are some of them. Then too when the pressure is sufficient to interfere with the ventricular circulation, which occurs early in infratentorial lesions, we encounter a hydrocephalus, most probably internal, with its accompanying choking of the optic discs and evidence of pressure everywhere within the cranial cavity. Spinal puncture in brain abscess would certainly help in diagnosis by an early demonstration of meningeal irritation but it is frowned upon by some upon the assumption that the disturbance of pressure may favor spread of the infection or even break down or impede the walling-off process.

So soon as one can feel sure of the diagnosis of abscess it should be drained. Some few have broken through to the outside and drained spontaneously but to await such an eventuality is to show an unjustifiable optimism, if not drained the abscess is probably far more likely to rupture into a ventricle and cause death very promptly.

There is another condition upon which I should like to touch and that is the possi-

ble effect upon the region of the ear of malocusion of the teeth. A malocusion which disturbs the normal relationship between the condyle and the glenoid fossa will sometimes produce symptoms referable to the ear alone. This is seen particularly in cases where sufficient teeth are missing on one side to destroy occlusion on that side; when the muscles of mastication contract the ramus on that side is pulled to a higher level and so cants the entire mandible disturbing the normal relationships of the joint. In the edentulous there is an abnormal degree of approximation and even when the teeth have become considerably worn there may be an increase in the normal limitation of action of the joint. Such a condition could also occur in cases where plates are not well fitted. The commonest symptom is pain in the region of the ear although function may also be deranged, such derangement is more likely to take the form of dizziness occurring upon eating. It has also been observed that many of the edentulous complain of a loss, or a distinct diminution of, the sense of taste.

These symptoms may be attributed to the nearness of the articulation to the middle ear and the corda tympani and in cases of pain in the ear which cannot be explained or dizziness after eating it might be well to examine the mouth.

CASE REPORTS AND CLINICAL SUGGESTIONS

A CASE OF AINHUM.

R. C. HILL, M. D.,
BELLAMY, ALA.

Ainhum is sufficiently rare, especially in women, to warrant the report of a case; and, so far as I have ascertained, this is the only one to be reported from Alabama.

Case report. Mary W., a negro woman, aged 33 years, widowed, came for treatment in April, 1928, for a painful, swollen right little toe. About seven years ago she noticed a callous on the medial side, and another on the lateral side, of this toe. These calloused areas gradually spread around the toe, completely encircling it, and the band became grooved. This groove has gradually deepened; the toe has been painful and swollen for the past three months, and ulcerated on its floor for two weeks. The left little toe has had a similar constricted callous around it for approximally the same length of time. This groove is not nearly so deep, nor is this toe painful.

Family History. Father is living, aged 56 years, and in good health. Mother died at age of 45 of "heart trouble". One brother and two sisters are living and in good health. The patient and her parents were born and have always lived in this immediate vicinity.

Medical History. Patient has had measles, malaria, influenza, and, in February, 1928, lobar pneumonia. The right little toe has been painful since this attack of pneumonia. Menses began at the age of 14 years and have always been regular.

Physical Examination. The physical examination does not give much of interest except the condition of the toes. The patient is a well-developed, well-nourishd negro woman of about 33 years of age of somewhat inferior mentality. The pupils react to light and accommodation; the patellar reflex is present; there is a whitish ring in the cornea resembling an arcus senilis. The veins of the feet are prominent; the right little toe shows a calloused band encircling the toe at the first interphalangeal joint. This band is constricted and is fissued along the medial and dorsal aspect. This raw surface does not bleed easily. Distal to this band the toe is swollen and tender, and is spherical in shape. The left little toe shows a similar band but the constriction is not nearly so marked; here the calloused area is more pronounced on the lateral surface and also medially, where it presses against the adjacent toe.

Wassermann reaction is negative and the urine shows nothing abnormal.

Notes. The patient has been seen often since the first examination; the ulcerated areas have healed; that is, become covered over with a thick, cornified layer, only later to lose that again. The toe is not painful now, but is still globular in shape. The groove has deepened, constricting the toe more. Roentgen-ray pictures show partial absorbtion of the ends of the bones making up the first interphalangeal joint, and lying under the callous ring. The left toe shows little change. The patient refuses amputation and it will be possible to watch developments in the case.

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THE USAGE OF WORDS.

Words have been used to express thoughts, ideas and intentions from the time the human race first separated itself by the process of evolution from the lower quadrupeds. Gradually there has evolved, in an orderly process, a certain formality in the use of words which is known as grammar. Conformity of grammatical rules is in a sense the index by which an educated man is distinguished from him who has lacked educational advantages. It follows that those who have enjoyed the blessings of training should speak a language which is understandable and agreeable to others. If one should strip from the vocabularies employed by the physician, the lawyer, or the priest the purely technical terms, he might expect to find that these men use similar modes of expression—a product of proper regard for respectable English usage. Perhaps, as to member of the other learned professions the result would be as expected, but in the case of the physician the researcher would most certainly be doomed to disappointment.

The use of slang, solecisms and jargon in medical meetings and writings has spread to such an extent that what to medical men often seems plain every-day English, would appear to other educated individuals as meaningless and barbarous. The summation of this violating of accepted usage is found even in the titles of books—a form of expression which most certainly should be impeccable. The "acute abdomen"—what does that term mean? A sagacious, a discriminating abdomen? As well speak of the "acute toe" or a "chronic breast". Surgeons are prone to say they are going "to operate a patient" or "to operate an appendix." It is true that patients may be worked, so to speak, but undoubtedly when ill they would prefer to be worked upon, rather than to be operated. Good usage requires that one speak of operating a machine, but of operating upon persons. Internists often speak of the "old cardiac" or "nephritic." Again a questionable expression is employed. Patients are said to be tubercular; perhaps they are similar to the anatomic tubercle or nodule to which the word tubercular refers, but the internist undoubtedly means that they are tuberculous—affected with tuberculosis.

Such incorrect use of words may be excused on the same plea that slang is condoned. In ordinary confabulations slang frequently adds to the work picture painted by the talker, but in thoughtfully prepared scientific writings it is inexcusable and so is the use of jargon.

MORTALITY IN AUTOMOBILE ACCIDENTS.

The Department of Commerce announces that during the four weeks ending October 6, 1928, 77 large cities in the United States reported 622 deaths from automobile accidents. This number (622) compares with 662 deaths during the four weeks ending October 8, 1927.

In the City of New Orleans in this particular time interval there were 21.3 deaths per 100,000 of population due to accidents in the city and 24.4 of total deaths within the city from accidents. This latter figure is higher than the first as of course it includes those individuals who were brought into the city for surgical treatment after an automobile accident in the surrounding country. These figures are approximately the same as a year ago. New Orleans is the only city in Louisiana or Mississippi which is reported. It stands fourteenth in the list, in the percentage of deaths per 100,000 population. Atlanta, Canton, Chicago, Cincinnati, Cleveland, Columbus, Detroit, Newark, Paterson, Salt Lake City, San Diego, San Francisco and Wilmington, Delaware are the only cities which proportionately have a greater number of deaths than New Orleans. This is not a record to be proud of. Despite the efforts that have been made by civic organizations urging the care in driving of automobiles, the rate this past year was higher than the year preceding. Furthermore, the death rate from automobile accidents per 100,000 population is higher by far than the greater majority of the larger of the great American cities, some of which have rates of only 10 per 100,000 population.

INFECTION WITH BACILLUS OF PFEIFFER.

A subject of considerable discussion among internists and laboratory workers is whether or not Bacillus influenzae is ever the primary cause of an infection. In certain diseases such as measles and whooping cough the organism undoubtedly is only a frequent secondary invader. On the other hand in epidemic influenza and many of that large group of infections diagnosed as colds definite proof has not been introduced that the organism is either a secondary invader or is primarily responsible for the disease. Walker* recounts an experience of a laboratory worker who had the misfortune to have a rabbit which was being infected experimentally with a strain of the Pfeiffer organism, repeatedly sneeze in his face. The laboratory worker felt several of these droplets strike his face. Twenty-eight hours after inoculating the rabbit he developed the usual symptoms with severe coryza, and these persisted for some days. At no time was there any fever. Organisms serologically identical with the laboratory strain were isolated from the secretions of the various mucous membranes affected.

Apparently this condition could be called a severe cold; of particular interest in the fact that this observation proves very definitely that the organism B. influenzae attacks the respiratory mucous membrane as the primary cause of disease.

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*Walker, John E.: Infection of Laboratory Worker with Bacillus Influenzae. J. Infect. Dis. 43:300, 1928.

HOSPITAL STAFF TRANSACTIONS

CHARITY HOSPITAL MEDICAL STAFF MEETING.

November 20, 1928.

In the absence of the Chairman, Dr. L. J. Dubos, Vice-Chairman presided. Dr. J. H. Smith presented the first case, showing the patient. The young white female had been in the ward for 5 months. She had been admitted with the complaint of pulmonary hemorrhage. Except for some dullness at the right apex her physical examination had been negative. The roentgenogram showed increased density of the right apex, and the report read consolidation with tendency to cavity formation. The process involved the whole of the upper right lobe. The roentgenograms were demonstrated. She had had periods of comparative well being, free from hemorrhage which had been followed by attacks of bleeding, as much as a teacupful at a time. The sputum showed no acid fast bacilli. She was given five doses of neoarsphenamine with no apparent benefit. Artificial pneumothorax had also been attempted. After a severe hemorrhage a transfusion had been given which had helped considerably. The patient still bled, though not as much as previously. The dullness over the right apex was thought to have decreased, and there was some questionable clearing of the area of density as shown by the roentgen ray. The onset of the condition followed after a tonsillectomy and was thought to have been a lung abscess at that time. Dr. Smith asked for suggestions as to the further treatment of the case.

Roentgenograms of another case were then shown. These were of a white female, aged 20 years, who began to have trouble two days following a tonsillectomy. The diagnosis of lung abscess had been made. The abscess had been rather large. The pictures showed the reduced size of the cavity following treatment with postural drainage only.

Dr. de la Houssaye commented on the first case, mentioned a case of lung abscess in a child which had done remarkably well with transfusion.

Dr. Durel suggested pneumothorax in the first case, followed by rentgenogram to be certain that collapse had been secured.

Dr. Jamison spoke of the possibility of a non-opaque foreign body being responsible for the condition in the first case. He suggested bronchoscopy and the use of lipiodol, both for diagnosis and therapy.

Dr. Durel spoke of the beneficial effects obtained from creosote inhalations in cases of lung abscess, and also advocated the use of bronchoscopy and lipiodol where indicated.

Dr. R. Lyons then presented a white female, aged 58 years, who had been in the ward about 1 month. The present illness had begun about 2½ months previously, with fever, cough, and pain in the chest. This was of short duration, and she returned to her usual household duties. Dyspnea and weakness then became marked; she consulted a physician who gave her digitalis and in a few days she was improved. The condition returned again shortly, this time associated with nausea and vomiting and continued until her admission. The past history was unimportant except for the fact that she had had pneumonia 8 years previously.

When first seen she was acutely ill, very orthopneic. The lungs were hyper-resonant with crepitant rales over the bases. The heart rate was rapid, and there was an apical murmur present. There was tenderness and resistance over the liver. The sputum was blood tinged.

The blood pressure could not be obtained. The urine was negative except for a trace of albumen. The P. S. P. was 40 per cent, intravenously. The Wassermann was negative and the non-protein nitrogen was 60 mg. Later the N. P. N. was 34 mg. Roentgenogram showed old healed tuberculosis at both apices. A clinical diagnosis of auricular fibrillation was made, and later the diagnosis of mitral stenosis.

The case was considered of interest for several reasons. The acute onset was unusual. The question of when the stenosis developed or how long it had existed, was interesting. The patient was not as sick as one would expect in a person who had as marked an auricular fibrillation as she had. The pulse could not be felt, and the blood pressure could not be obtained. She was given 1/300 grain ouabain intravenously and the effect was remarkable. The pulse came back and shortly the blood pressure could be read. The next day she was given 1/240 grain ouabain, and thereafter digitalis, with improvement.

Dr. Jamison discussed the prognostic significance of the blood pressure in mitral stenosis, stating that with an elevation of blood pressure the prognosis is usually good, while with a low pressure the patient rarely lives beyond the age of 40 years. He mentioned the fact that valvular lesions are usually difficult to diagnose in the presence of auricular fibrillation. The use of oubain was commended with the opinion that it is not a dangerous drug when properly used, is

excreted in 12-24 hours, and can be used while waiting for the digitalis effect.

Dr. Herrmann mentioned the occurrence of pneumofibrosis resulting from chronic congestion in mitral stenosis.

WILLARD R. WIRTH, M. D.

TRANSACTIONS OF THE CHARITY HOSPITAL SURGICAL STAFF

The regular monthly meeting of the staff was held November 18, with Dr. Graffagnino presiding. At this meeting the Chairman explained that he would supply members of the staff with a monthly mortality report. He stated the membership would probably be interested in knowing these figures by sections, *i. e.*, General Surgery, Gynecology, Obstetrics, etc. Accordingly, each member in attendance was supplied with a report of the previous months deaths and admissions—which had been compiled by the secretary of the staff, Dr. Loria. It was proposed that this plan be continued and elaborated from time to time.

Nothing else of any particular interest scientifically was presented except a bone tumor specimen, an opinion on which was withheld until the case was studied more carefully.

FRANK L. LORIA, M. D.

TRANSACTIONS OF THE PRESBYTERIAN HOSPITAL CLINICAL SOCIETY.

The November meeting of the society, as the previous others, was presided over by Dr. John W. Lindner.

On completion of the usual business Dr. Chas. L. Cox read a short paper dealing with "Some Recent Observations on the Treatment of Sinus Disease". He explained that the tendency is away from the heretofore radicalism in the treatment of these diseases, and in favor of conservatism. The acute sinus infections were stated as being especially those needing conservative care. In children, it was stated, one must be ultra conservative in the treatment of acute maxillary sinus disease. Acute frontal sinus infections must also be dealt with carefully. Should there be an empyema which can not be relieved by any of the other simple methods—external trephining must be done.

Dr. Cox explained that the roentgen-ray was very valuable in diagnosis of sinus disease, but added that unnecessary chances are taken when one uses lipiodal or any other material to show the areas up better; and he cited a case where the lipiodal went out into the cranial cavity and into the spinal canal—but fortunately, without any trouble developing.

Following this Dr. H. R. Unsworth presented an interesting case of sclerotic myelitis. The case was exceptional because it simulated tabes. She had been given antiluetic treatment in the past simply because her husband had been luetic. However, her serological findings—blood and spinal fluid—were always negative. Clinically she had vibratory changes, absent knee jerks, fixed pupils, right Babinski, positive Rhomberg, swaying gait, sluggish bladder, and slight ptosis of the left eye-lid.

This case was seen by several neurologists and it appeared that the only diagnosis possible was that of sclerotic myelitis.

FRANK L. LORIA, M. D.

FRENCH HOSPITAL MEDICAL STAFF MEETING.

A regular meeting of the French Hospital Staff was held on October 12, 1928. The minutes of the last meeting were read and approved.

The report of patients discharged during the month of September showed a marked improvement over that of previous months.

Dr. Graffagnino announced that the French Government would make a donation to the Hospital.

Deaths occurring during the month of September, due to chronic interstitial nephritis, bronchial pnuemonia, and toxemia of pregnancy, were discussed by Dr. F. J. Beyt. Dr. L. Menville asked for a more careful observation of cases before making a diagnosis.

Dr. P. Graffagnino announced that the assembly hall would be converted into a reading room for members of the staff. Donations of books and journals would be accepted. Dr. D. N. Silvermann suggested that the Orleans Parish Medical Society might make a permanent loan of some of their duplicate books and magazines.

Dr. D. N. Silvermann was asked to present an abstract at the next meeting.

Dr. E. L. Zander was appointed to assist Dr. F. J. Beyt in getting members of the staff to present their cases.

Dr. W. H. Harris announced that the basal metabolism apparatus had been installed.

VICKSBURG SANITARIUM.

Tuberculous Peritonitis With Chronic Intestinal Obstruction.

Presented by Dr. J. A. K. Birchett, Jr.

November 10, 1928.

Patient: A colored male, aged 28, single, a government clerk, gave the following history: Several years ago he began having digestive disturbance and abdominal pain, gradually becoming worse. The diagnosis of gall bladder disease and appendicitis was made by his physician. Gall bladder was drained and appendix removed in 1926, but symptoms persisted. One year ago he noticed swelling at site of abdominal scar, which was diagnosed as an early hernia. Since that time he has had fever, loss of weight, and abdominal pain. Denies venereal infection; had influenza and bronchitis in 1918. He has had flatulence and constipation with occasional attacks of diarrhea.

The family history gives no information as to present history.

Physical examination: Gives no information as to present condition. The lungs show no rales or areas of dullness and roentgen-ray examination of lungs is negative. The abdomen shows marked distention with old right rectus scar, prominent near middle, sacculated, easily emptied with regurgitation, thin wall—apparently a hernia or collection of fluid or pus. The roentgen-ray studies showed gastro-intestinal tract pushed to left side of abdomen with apparently a mass in right lower quadrant and lumbar region.

Procedure: Under local anesthesia, the protusion in old scar was opened and 500 c.c. of purulent material evacuated. The walls of abscess showed granulations with no foreign body found and no anatomical landmarks distinguishable. The abdomen was closed with drainage. Patient improved in general appearance and strength and was discharged on thirty-first post-operative day with freely draining fecal fistula.

Subsequent history: The patient returned one month after discharge with increased discharge from fecal fistula, which at one time had nearly closed, and complaining of intermittent diarrhea and constipation. The patient was apparently in better condition than when first seen, but had pain in region of sigmoid, descending colon, and umbilical region. Barium study showed a large collection, apparently in terminal ileum, with evidence of constriction. A tentative diagnosis of tuberculous peritonitis with chronic intestinal obstruction was made, and exploratory operation advised.

Procedure: Under gas-ether anesthesia, the abdomen was opened at inner side of fistulous tract. Peritoneum was easily opened. There were many adhesions about terminal ileum, which was distended with fecal contents and of paper thinness. The transverse and ascending colon was mostly collapsed due to obstruction at cecum, which was very thick and studied with tubercles. The mass was so fixed that resection was impossible, and anastomosis was done between distended terminal ileum and transverse colon, thus diverting fecal stream past the obstructed cecum. The abdomen was closed without drainage and patient has had an uneventful convalescence. The fecal fistula has gradually closed and patient is much improved.

TWO HUMAN CASES OF RABIES.—Rice reports two cases seen in Indiana during 1927. Each patient was bitten by a dog which was proven rabid by the finding of typical Negri bodies by the laboratory of the Indiana State Board of Health. Both received first aid treatment, in one case at least nitric acid being used. Both were boys, and both were bitten through the upper lip—a very dnagerous place. Both received the full fourteen-dose phophylactic treatment without interruption. The virus used was that of a firm which is very careful and conscientious in the preparation of its product, which is a modified Harris preparation of the living virus. Virus from the same firm was used in the two cases. In one case, the period elapsing before treatment was begun was three days; in the other case, it was four days. Both patients were brought to the Riley hospital after symptoms were well advanced and both died in less than twelve hours after being admitted. Both had complete autopsies and both had Negri bodies demonstrated in the brain. In one there were four positive animal inoculations; in the other there were no animal inoculations as the diagnosis was absolutely positive without it. The point emphasized is the extreme danger of a bite on the lip. Patients so mutilated should begin treatment immediately and not wait three or four days for the examination of the brain of the animal. Furthermore, there is reason to believe that fourteen treatments are not enough under such conditions. At least twenty-one are recommended. Cauterization of the wound with nitric acid failed in one of these cases, but it was not done until "several hours after the injury." The incubation period in one case was eighteen days, and in the other, ninety-two days. In the latter case, the symptoms were probably delayed by the treatment, and, as the child did not suffer as horribly as the classic picture of rabies would lead one to expect, the treatment was not entirely a failure, even though the child did die. The first case described was so mild that several experienced physcians refused to believe that it was rabies until the evidence of Negri bodies and positive animal inoculation was brought before them. The latter case was one of the wildest demonstrations imaginable—a nerve racking spectacle—and left no doubt as to diagnosis. It is often said that human beings and other animals which do not commonly protect themselves with their teeth, or bite when angry, will not attempt to bite their attendants when they have rabies. One of these patients repeatedly tried to bite those about him, and, as a matter of fact, did succeed in biting two nurses—one on the finger and the other on the back of the hand.—J. Am. Med. Assoc., 91:1631-1632, 1928.

TRANSACTIONS OF ORLEANS PARISH MEDICAL SOCIETY

TRANSACTIONS OF THE ORLEANS PARISH MEDICAL SOCIETY.

Besides the regular meeting of the Board of Directors, the Society held one Clinical Meeting at the United States Marine Hospital.

The following cases were presented at this meeting by members of the Staff of the Marine Hospital:

Four cases illustrating the various phases of the injection treatment of varicose veins, one case of Milroy's disease, three cases of aortitis, one case of periosteal-osteitis of the sacrum, one case of destruction of the pubis of unknown causation, one case of cerebrospinal lues with unusual manifestations and one case of thrombo-angeitis obliterans.

Following the meeting refreshments were served.

The second December meeting was dispensed with on account of confliction with the holidays.

December 4, the third Stanford E. Chaillé Memorial Oration was held with Dr. Carl J. Wiggers of Cleveland as the orator. The subject of his paper was, The Value and Limitations of Laboratory Methods in Clinical Investigation of Cardio-vascular Diseases.

The annual election of officers for the year 1929 was held Saturday, December 8. The following officers were elected:

Dr. E. D. Fenner, President.
Dr. C. Grenes Cole, First Vice-President.
Dr. Frederick L. Fenno, Second Vice-President.
Dr. Adolph Jacobs, Third Vice-President.
Dr. H. Theodore Simon, Secretary.
Dr. John A. Lanford, Treasurer.
Dr. Daniel N. Silverman, Librarian.

Additional Members
Board of Directors

Dr. P. Graffagnino. Dr. J. Birney Guthrie.
Dr. Wm. D. Phillips.

The annual banquet of the Society was held at the Chess, Checkers and Whist Club, and the election results were read at this time.

During the week of December 3-8 the annual Longer Life Week was held. Members of the Society made addresses on the value of periodic health examinations before universities, high schools and co-operative clubs of the grammar schools, and over the radio and before the luncheon clubs of the city. Streamers were strung in front of the hospitals. Posters were displayed in all large department stores and there was much publicity given this week by the press. Dr. Leopold Mitchell, Chairman, and the personnel of this Committee deserve full credit for the success of this week.

The Secretary's office is in receipt of a communication from Dr. P. T. Talbot, Secretary-Treasurer of the Louisiana State Medical Society, stating that dues for 1929 ($4.00) are payable in advance. Please send your check in for this amount and include your check for dues in the Parish Society.

TREASURER'S REPORT

Actual Book Balance, 10/31/28	$82.38
Receipts during November	2,489.16
	$2,571.54
Expenditures:	$611.23
Book Balance 11/28/28	$1,960.31

LIBRARIAN'S REPORT.

Eighty-seven books have been added to the Library during November. Of these 54 were received by gift, 21 by binding and 12 from the New Orleans Medical and Surgical Journal.

Gifts of journals, books and pamphlets have been received from the following persons: J. H. Musser, C. Jeff Miller, Haidee Weeks and Joseph Hume.

Notation of new titles of recent date is appended herewith:

NEW BOOKS—NOVEMBER.

Hazen—Syphilis. 1928.
Clark—Determination of Hydrogen Ions. 1928.
Southern Surgical Association. Transactions. 1928.
International Clinics. Sept., 1928.
International Medical Annual. 1928.
American Gynecological Society, Transactions. 1919-22.
U. S. Public Health Reports. V. 43. pt. 1, 1928.
Terry—Opium Problems. 1928.
Giltner—General Microbology. 1928.
Moynihan—Addresses on Surgical Subjects. 1928.
Cemach—Surgical Diagnosis. 1928.
Cumulative Supplement and Composite Index, to Gynecological and Obstetrical Monographs. 1928.
Scott—Hughes Practice of Medicine. 1928.
Index-Catalog of the Surgeon-General's Office. V. 7. 1928.

H. THEODORE SIMON, M. D.,
Secretary.

LOUISIANA STATE MEDICAL SOCIETY NEWS

H. Theodore Simon, M. D., Associate Editor.

TO THE MEMBERS OF THE LOUISIANA STATE MEDICAL SOCIETY:

At the opening of the year 1929 the Chairman of the Committee of Arrangements wishes to remind you that the Louisiana State Medical Society will celebrate the greatest event of its life, the semi-centennial celebration of its organization. Plans have been made for elaborate preparations, and New Orleans is ready to receive you with its usual bountiful hospitality. The dates of the meeting are April 9, 10 and 11, 1929, and at this time of the year New Orleans is at its best. The temperature is temperate, the sun sheds plentifully its beautiful sunshine, the gardens are in bloom, and with all the points of interest intimately connected with the history of the City, she feels that she can offer you a week of unusual pleasure and amusement, to say nothing of the interesting program of the meeting. The committee has in mind a special night where the celebration will really take place, and hopes to make this occasion memorable from an artistic, oratorical and social standpoint. A large attendance is expected, and we believe with the great road facilities extending throughout the State that motoring to New Orleans should be an added attraction and should swell our attendance beyond all past records.

The following is a list of Chairmen of the Sub-Committees of the Arrangement Committee, who will take care of the various arrangements:

Committee on Finance—Dr. E. D. Fenner.

Committee on Registration—Dr. Walter J. Otis.

Committee on Booths—Dr. O. C. Cassegrain.

Committee on Signs and Decorations—Dr. E. L. Leckert.

Committee on Ladies' Entertainment—Mrs. C. V. Unsworth.

Committee on Badges—Dr. Marcy J. Lyons.

Committee on Scientific Exhibits—Dr. Foster M. Johns.

Committee on Entertainment—Dr. Homer Dupuy.

Committee on Publicity—Dr. Lucien A. LeDoux.

Committee on Hotel—Dr. J. C. Menendez.

Committee on Golf—Dr. Allan Eustis.

The Chairman takes this occasion to offer you his very best wishes for a prosperous and happy New Year.

Dr. Paul J. Gelpi, Chairman,
Committee on Arrangements.

NOTICE

According to the By-Laws of the Louisiana State Medical Society, dues for the fiscal year of 1928 are now due. Secretaries of the various Parish Societies should begin at once to collect the annual State dues from its members for 1928, and remit as promptly as possible to the Secretary-Treasurer at 1551 Canal Street, New Orleans. Any members from unorganized parishes are requested to send in their dues direct to the Secretary-Treasurer of the State Society.

In this regard we would like to call your attention to the fact that the protection under the Medical Defense of the State Society is only covered from the time that individual dues are received by the Secretary-Treasurer of the State Society. It is therefore urgent that these dues be remitted as promptly as possible in order that one may have full protection under our Medical Defense Act.

CHAIRMEN OF SECTIONS

The following Chairmen of Scientific Sections for the approaching meeting of the Louisiana State Medical Society, New Orleans, April 9, 10 and 11, 1929, have been appointed by the President:

Medicine and Therapeutics—Dr. Robert Bernhard, New Orleans.

Pediatrics—Dr. R. T. Lucas, Shreveport.

Nervous Diseases—Dr. C. V. Unsworth, New Orleans.

Bacteriology and Pathology—Dr. Andrew Friedrichs, New Orleans.

Public Health and Sanitation—Dr. E. B. Godfrey, Minden.

Gastro-Enterology—Dr. J. B. Vaughan, Monroe.

General Surgery—Dr. Roy B. Harrison, New Orleans.

Gynecology and Obstetrics—Dr. P. Graffagnino, New Orleans.

Eye, Ear, Nose and Throat—Dr. Lional F. Lorio, Baton Rouge.

Urology—Dr. C. M. Horton, Franklin.

Radiology—Dr. W. F. Henderson, New Orleans.

Orthopedic Surgery—Dr. P. A. McIlhenny, New Orleans.

Those desirous of reading papers should communicate with the various Chairmen as promptly as possible. The program for each Section must be in the hands of the Secretary-Treasurer not later than February 9, 1929.

TO ALL DISTRICT AND PARISH SOCIETIES

Your attention is directed to the following resolution which was passed at the last meeting of the House of Delegates:

"That the President of the State Society be notified, in advance, of all district and regional society meetings in the State, so that he may attend, if possible."

Accordingly, proposed meeting times in the future should be sent to our President as early as is consistent, in order that he might avail himself of the opportunity of attending if possible.

MINUTES OF THE WINTER MEETING OF THE SEVENTH DISTRICT MEDICAL SOCIETY

The Seventh District Medical Society held its Winter meeting in the Egan hotel, Crowley, December 6, 1928.

The meeting was called to order by Dr. J. W. Faulk, president. The large attendance of members and the number of prominent guests, supplemented by the delightful banquet, contributed in making the meeting one of the best since the Society's organization.

After being introduced by Dr. Faulk, Mayor H. Gordon Brunson of Crowley extended the city's welcome. He paid tribute to the medical profession in his address of welcome.

The minutes were read, and upon motion, approved. Following the reading of the resolutions on the death of Dr. E. M. Ellis, it was motioned and seconded that copies be distributed in accordance with the resolution. In a very touching address, Dr. Mayer of Opelousas eulogized Dr. Ellis.

Upon motion of Dr. E. J. Cather of Oakdale, resolutions on the death of Dr. S. M. Scott, his former associate, were ordered prepared for submission at the next meeting. A committee composed of Dr. E. J. Cather, Oakdale; Dr. T. C. Moody, De Ridder, and Dr. D. C. Isles, Lake Charles, was appointed to draw up the resolutions.

Jennings was selected as the next meeting place, after the withdrawal of an invitation to meet in Lake Charles.

The excellent scientific program, consisting of very instructive and interesting papers, was as follows:

1. Local Anesthesia of the Pelvic Outlet, Dr. Carroll W. Allen, New Orleans.

2. The Treatment of the Physically Subnormal, Dr. Oscar W. Bethea, New Orleans.

3. External Epitheliomata and their Treatment, Dr. M. T. Van Studdiford, New Orleans.

4. Surgical Treatment of Arthritis, Dr. John T. O'Ferrall, New Orleans.

In appreciation, Drs. Allen, Bethea, Van Studdiford and O'Ferrall were elected honorary members of the Society. It was ordered that these papers be submitted for publication in the New Orleans Medical and Surgical Journal.

S. R. Henry, M. D.,
Secretary-Treasurer.

RESOLUTIONS ON THE DEATH OF DR. E. M. ELLIS

Whereas, it has pleased the Almighty, on August 10, 1928, to remove from our midst one of the oldest and most highly respected of the medical profession, an esteemed physician and surgeon, useful citizen, Dr. Elijah Madison Ellis, and:

Whereas, in the death of this illustrious gentleman, the medical fraternity, Acadia Parish and Louisiana, sustain the loss of a man whose loyalty to all classes and creeds was unswerving, the loss of a man who towered high in the estimation of those who value rectitude and who have a proper appreciation for the lofty attributes which make the private and public career, such as that of Dr. Ellis, honorable and beautiful, therefore be it:

Resolved, that the Seventh District Medical Society, whose privilege and honor it has enjoyed with the affiliation and cooperation of so valuable a member—the founder and first president of the Society—wishes to chronicle the death of a brother physician whose life has been an unbroken chain of charitable and industrial performances and whose noble deeds of professional ethics and kindness all serve as a beacon light to posterity, therefore be it further:

Resolved, we extend the Society's sincerest condolences to his sorrowing widow and family, and that a copy of these resolutions be sent to them, a copy for publication in the New Orleans Medical and Surgical Journal, and a copy spread with our minutes as a permanent record.

B. A Littell, M. D.
T. H. Watkins, M. D.
M. L. Hoffpaur, M. D.

The East and West Feliciana Bi-Parish Medical Society met in the office of the President, Dr. E. M. Toler.

The essayist, Dr. Allan C. Eustis of New Orleans read a most excellent paper on myocarditis, which was favorably discussed by members pres-

ent. Dr. Eustis also demonstrated the Tycos sperometer with Faust attachment and proved to all present the beneficial and helpful results from the use of this instrument.

Officers elected for 1929 were: Dr. J. W. Lea of Jackson, President; Dr. C. S. Miller, Jackson, Vice-President; Dr. E. M. Toler, Clinton, Secretary-Treasurer; Delegate to Louisiana State Medical Society, Dr. E. M. Toler; Alternate, Dr. M. S. Freiman. Physicians present were: Drs. Eustis, Jones, Young, Morgan, Miller, Freiman, Lea, Shaw and Toler. At 1:00 p. m. an elaborate banquet was served in the Rist Hotel.

LOUISIANA STATE PEDIATRIC SOCIETY

The next meeting of this society will be held on Monday of the week of the meeting of the Louisiana State Medical Society, in New Orleans. The program will be usually good and we expect a large attendance. Anyone interested in becoming a member of the society should write the secretary-treasurer, Dr. C. T. Williams, 7401 Burthe St., New Orleans.

PARISH MEDICAL SOCIETY OFFICERS FOR 1929

The following Parish Medical Societies have elected officers for 1929 as follows:

East Baton Rouge Parish Medical Society:

President—Dr. Rhett McMahon, Baton Rouge.

Vice-President—Dr. C. E. Latham, Baton Rouge.

Secretary-Treasurer—Dr. H. W. A. Lee, Baton Rouge.

Delegates—Dr. John McKowen, Dr. C. A. Lorio, Dr. Rhett McMahon.

DeSoto Parish Medical Society:

President—Dr. R. A. Tharp, Mansfield.

Secretary-Treasurer—Dr. D. C. McCuller, Mansfield.

Vernon Parish Medical Society:

President—Dr. J. S. Branch, Leesville.

VicePresident—Dr. F. P. Jones, Leesville.

Secretary-Treasurer—Dr. D. O. Willis, Leesville.

Delegate—Dr. D. O. Willis, Leesville.

Alternate—Dr. M. W. Talbot, Leesville.

Dr. Amedee Granger, Professor of Radiology in the Graduate School of Medicine of the Tulane University of Louisiana, attended the Convention of the Radiological Society of North America held at Chicago, Ill., beginning December 2, 1928, where, at the request of the Scientific and Clinic Committee, he gave two clinics.

Dr. E. Denegre Martin, Dr. Urban Maes, Dr. Isidore Cohn and Dr. Joseph A. Danna, members of the staff of the Graduate School of Medicine of the Tulane University of Louisiana, attended the meeting of the Southern Surgical Association held at White Sulphur Springs, Va., beginning December 10, 1928.

MEETING OF THE TRI-STATE MEDICAL SOCIETY

We wish to call your attention to the meeting of the Tri-State Medical Society of Texas, Louisiana, and Arkansas in which your readers should be vitally interested. Our Society has grown from a mere infant to over two thousand members. Our meetings are now largely attended and programs put out by this Society are second to none in the country. The better men all over the world contribute to the success of our organization. The meeting is to take place in Texarkana, January 17 and 18, 1929.

Frank H. Walke, Secretary.

Sanitary Engineer A. W. Fuchs. Directed to proceed from Jackson, Miss., to Jacksonville, Fla., and return, in connection with field investigation of milk.

MEETING OF ST. TAMMANY MEDICAL SOCIETY.

The regular monthly meeting was held on Friday night, December 14, at 8 P. M. This was the annual one for strictly business and election of officers for the ensuing year.

The following doctors answered roll call: F. F. Young, G. McG. Stewart, H. E. Gautreaux, W. L. Stevenson and L. Roland Young, of Covington, La.; F. R. Singleton, J. K. Griffith and J. F. Polk, of Slidell, and A. G. Maylie, of Mandeville. The President, Dr. F. F. Young, and Secretary-Treasurer, L. Roland Young, were at their post.

A letter was read from Dr. Talbot regarding the $5.00 registration fee at the State meeting. This was freely discussed, and nobody thought this should be the case, and the following resolution was made by Dr. J. K. Griffith, and seconded by Dr. J. F. Polk: That the St. Tammany Parish Medical Society go on record as opposing any registration fee at State Medical Society Meetings, and that the Secretary-Treasurer so notify Dr. Talbot and the State Medical Journal. Dr. Maylie here asked for a roll call and a vote—all voting yea.

After the business and routine matters were dispensed with it was moved and unanimously carried that the Secretary write Dr. Paine a letter of condolence and expressed therein the

sympathy of each and all of us for him and his over the loss of his beloved wife, one who will be so much missed by all in their community and the surrounding country.

The election of officers was then in order and L. Roland Young was chosen as President and A. F. Herrin Secretary-Treasurer. Dr. A. G. Mylie was re-elected as Delegate and J. K. Griffith Alternate to State Medical Society. W. L. Stevenson was elected Vice-President.

Mandeville was selected as the next meeting place and Bechac's will be the grounds for the annual banquet and installation of officers.

L. Roland Young, Secretary-Treasurer.

TRI-STATES MEDICAL ASSOCIATION.

All of us think sometimes there are too many medical societies. But one that has functioned regularly for nearly half a century must have something worth while about it. And when that particular one gets better every year you know it must be worth while.

You may or may not know this one I am writing about is one of the few societies really profitable both to men in general work and those engaged in special lines. It has no sections and every address is pointed right at the weak point in the whole scheme of the practice of medicine. And that is, as you have often thought, the borderline where general medicine and the specialties meet. The general practitioner must know something of the specialist's work and the latter ought to know a good deal of general medicine.

The Tri-States Medical Association of Mississippi, Arkansas and Tennessee, will meet at Hotel Peabody, in Memphis, on February 6-7-8, 1929. For absolute quality, pure and undefiled, the program to be presented has never had a superior at any medical gathering in the South. That is a calm statement of fact—not boasting. There have been several which had more bulk, but few have ever approached it in worth. Read the list of speakers further over in this issue and begin right now arranging your affairs so you can hear every one of them. It means an intensive, varied, postgraduate course you can't *afford* to miss! If you fail to receive a program write me for one.

This is a medical meeting and not a golf-stick, trap-gun gathering. If you want to hear intelligent men talk interestingly and instructively on important medical subjects, come.

Most of us can still learn a little.

Dr. A. F. Cooper,
Bank of Commerce Building, Memphis, Tenn.

NEW ORLEANS PURE MILK SOCIETY.

The activities of the Pure Milk Society are well shown by the recent report of the Bacteriologist and Inspector of the Certified Milk Commission, H. N. Heffernan. During the months of October and November, the report being dated December 1, 65 samples of milk were collected and examined, and 232 other samples were gotten together for examination. A total of 905 bacteriological and chemical examinations were made in the laboratory. One thousand four hundred sixty-five head of cows and bulls were subjected to physician examination, and 289 cattle were tested for tuberculosis. Two hundred fifty-eight herd milk samples were examined, and 16 dairies inspected. The Commission has two dairies from which certified milk may be purchased, the Colonial Dairy and Cloverland Dairy. Inspected milk may be secured from the Gillis Dairy and the Gregory-Jung Dairy.

NOGUCHI HONORED.—Dr. Hideyo Noguchi, famed bacteriologist, who succumbed last May to the effects of yellow fever while studying the disease on the African west coast, was memoralized by his associates of the Rockefeller Institute recently. Dr. William H. Welch of Johns Hopkins University, and dean of American medical scientists, declared the world should know that Dr. Noguchi's claim to fame did not rest solely on the final judgment of his yellow fever experiments.

"I think this needs a little emphasis," Dr. Welch said, "because should it appear, as it is likely to, that the American disease and the African disease are identical; should it appear that Noguchi's lepto-spiro is not the cause of genuine yellow fever, it does not imply that Noguchi's work was not a very important contribution. It is a contribution of the first importance if the lepto-spiro is a secondary invader in yellow fever."

Dr. Welch pointed out that the yellow fever researches of Dr. Noguchi were only a part of the great scientific contribution in other diseases which he studied with "an extraordinary ingenuity and artistry."

Dr. Simon Flexner, director of the institute, gave a picture of Dr. Noguchi's life, from his childhood in a little northern Japanese village to the peak of his career. Dr. Flexner said he first met Dr. Noguchi during the Spanish-American War, when he was a member of a Johns Hopkins University Commission sent to the Philippines to study epidemic diseases. Stopping over in Japan, he met the young doctor, who expressed a desire to come to America.

The story was told of how Noguchi landed here with only a few dollars. Handicapped by lack of funds and a poor knowledge of this country's customs, Noguchi was none the less deterred in his determination to contribute to human welfare, Dr. Flaxner said.

Others who spoke were Dr. George E. Vincent, president of the Rockefeller Foundation; Dr. Theobald Smith of the Rockefeller Institute, and Setsuzo Sawada, counsellor of the Japanese Embassy at Washington.—New York Times, December 21, 1928.

MISSISSIPPI STATE MEDICAL ASSOCIATION NEWS

J. S. Ullman, M. D., Associate Editor.

CHILDREN'S CLINIC

The Mississippi Society for Crippled Children at the end of the first week in December completed, at Oxford, the Crippled Children's Clinic for northeast Mississippi. Fifty-five children were examined and forty-seven of these were recommended for treatment. The local Kiwanis, Rotary Clubs, the P. T. A., Junior Chamber of Commerce, County Superintendent of Education, medical students from the University of Mississippi were among the organizations cooperating in this work.

Dr. T. W. Foster, aged 78 years, of Tchula, died November 27. He was a native of Madison County but had practiced in Holmes County for many years. He was a member of the Methodist Church, Masons and Eastern Star and was also the local railroad physician. He was buried in Tchula.

The Journal extends its heartfelt sympathy to his bereaved family.

HOSPITAL ORGANIZED

December 8, the Newton Infirmary, Newton, Mississippi, formally opened and organized its staff. The institution was recently purchased by Drs. M. L. Flynt and H. McMullan, and has been repaired and enlarged.

Regular staff members are: Drs. R. W. Hall, A. G. Pouchstone, R. C. Stingley, M. L. Flynt, Dudley Stennis, T. E. Jardis and H. McMullan. Visiting staff members are: Drs. Henry Boswell, E. E. Kemp, W. C. Polk, W. T. Hunter, S. A. Majure, C. D. Gilmore, T. L. Gandy, W. C. Lamb, A. M. Harelson, A. L. Majure and Dr. Arrington.

Officers are: Dr. M. L. Flynt, President; Dr. Dudley Stennis and Dr. T. E. Jardis, vice-presidents.

Dr. Coleman C. Burns has recently settled in Greenville where he is specializing in diseases of the eye, ear, nose and throat. Dr. Burns is a graduate of the Medical College, University of Tennessee, and formerly resided in Memphis.

Dr. William Ross May of Amory, Mississippi, has been appointed head of the new Lincoln County health unit by the board of supervisors. He is a graduate of the University of Mississippi and Tulane University; has had extensive hospital experience and five years practice.

The Tri-County Medical Society met in Brookhaven, December 12, and elected officers for the ensuing year as follows:

President—Dr. B. S. Waller, Silver Creek.

Vice-Presidents—Dr. D. T. Langston, New Hebron; Dr. H. R. Fairfax, Brookhaven; Dr. L. W. Brock, McComb; Dr. R. E. Sylerstein, Tylertown; Dr. C. L. Simmons, Hazlehurst.

Secretary-treasurer—Dr. J. K. Markette, Brookhaven.

Legal Counsellor—Dr. F. E. Collins, Brookhaven.

Delegates—Dr. O. N. Arrington, Brookhaven; Dr. W. L. Little, Wesson; Dr. A. B. Harvey, Tylertown; Dr. F. F. Conn, Monticello; Dr. R. H. Brumfield, McComb.

Dr. E. B. French and Dr. R. H. Brumfield were the essayists.

The next meeting was announced for March 12 to be held in Brookhaven.

ORAL HYGIENE

Miss Gladys Eyrich, director of oral hygiene for the Mississippi Board of Health, has announced that the third 100 per cent school in the state for this term in dental corrections is the Cary school of Sharkey County. Work there was carried on in cooperation with the local Red Cross, the organization obtaining and paying for the services of a dentist.

The last semi-annual meeting of the Clarksdale and Six Counties Medical Society was held in Clarksdale, November 7. Officers for the ensuing year are as follows:

President—Dr. H. G. Johnson, Dundee.

Vice-presidents—Boliver, J. L. Nichols; Coahoma, J. W. Henderson; Tallahatchie, J. G. Backstrom; Tunica, M. B. Jernberg; Quitman, M. V. Kirby.

Member of Board of Censors: J. W. Henderson.

Secretary—D. V. Galloway.

The program was as follows:

1. Radium Therapy in Cancer of the Cervix—A. B. Carney, Clarksdale.

2. Fracture of the Surgical Neck of the Humerus—T. C. Mitchell, Clarksdale.

3. Otitis Media—E. Leroy Wilkins, Clarksdale.

4. Pellagra—J. A. Slack, Friars Point.

5. Malaria (President's address)—J. D. Biles, Sumner.

6. Plasmochin—L. H. Brevard, Dundee.

7. Syphilis of the Lung—H. L. Cockerham, Gunnison.

8. Examination of Children's Ears—Eugene Rosamond, Memphis.

9. False Neuromata—T. G. Hughes, Clarksdale.

10. Needs of our State and Local Associations—Dr. W. H. Frizell, Brookhaven.

At the banquet which followed the evening session the notable events were an informal talk by Dr. F. J. Underwood, Executive Officer of the State Board of Health.

At an informal meeting the Coahoma County doctors decided to reorganize the Coahoma County Medical Society and the fifth of December was set for the first meeting.

On December 11 the Issaquena-Sharkey-Warren Counties Medical Society met in Vicksburg. The formal program was:

1. Throat Infections in General Medicine—Dr. J. H. Musser, Professor of Medicine, Tulane University College of Medicine, New Orleans.

2. Goitre in Some of its Phases—Dr. E. M. Holder, Professor of Surgery, University of Tennessee College of Medicine, Memphis.

3. Mechanism of Reduction of the More Common Fractures—Dr. Guy A. Caldwell, Orthopedic Surgeon, Shreveport.

It was reported that this was an unusually good meeting. In addition to the members and the invited guests from Louisiana and Mississippi, the Mississippi County Health Officers and Inspectors temporarily adjourned their meeting in Jackson and attended the Vicksburg meeting.

Dr. A. T. McCormick of Louisville, Kentucky, transferred his scheduled address from Jackson to Vicksburg. His subject was, The Doctor's Duty to the Community in the Prevention of Disease.

At this meeting officers were elected for the ensuing year:

President—Dr. W. C. Pool, Cary.

Vice-presidents—Issaquena: Dr. T. W. Huey, Grace; Sharkey: Dr. L. E. Martin, Anguilla; Warren: Dr. Hugh H. Johnston, Vicksburg.

Secretary-treasurer—Dr. L. S. Lippincott, Vicksburg.

Board of Censors—three years, Dr. Augustus Street, Vicksburg; two years, Dr. H. S. Goodman, Cary.

Member of Committee on Medical Defense—Dr. E. F. Howard, Vicksburg.

During the latter part of November Dr. L. L. Lumsden, Director of Rural Sanitation, United States Public Health Service, was in Mississippi for several days for the purpose of inspecting the full time health units. After his work in Mississippi, he was scheduled to make inspections in Tennessee.

Dr. Henry E. Austin, psychiatrist at the East Mississippi Insane Hospital in Meridian, has accepted a position as chief medical officer at the Veterans Bureau hospital in Philadelphia, Pennsylvania, and was scheduled to leave for his new position about December 15.

HOSPITAL CLOSED ON ACCOUNT OF INFLUENZA

Early in December the South Mississippi Charity Hospital at Laurel was closed to the admission of new patients because of an epidemic of influenza among the patients, doctors and nurses. The out-patient clinic was discontinued and no visitors were allowed in the hospital. At the last report, the condition is said to be improving.

The South Mississippi Medical Society was scheduled to meet in Laurel, Mississippi, on December 13. The following were the essayists: Dr. W. A. Dearman, Gulfport; Dr. R. W. Hall, Jackson; Dr. C. G. Wright, Hattiesburg; Dr. C. S. Holbrook, New Orleans; Dr. C. E. Burnham, Bay Springs; Dr. J. S. Gatlin, Laurel; Dr. C. M. Davis, Laurel.

Bills fostered by Gov. Bilbo for a central purchasing board for State institutions and another providing for a State Board of Charities were both defeated by the special session of the Legislature.

On December 3, the Adams County Board of Supervisors in a joint meeting with the Mayor and Board of Aldermen of Natchez elected Dr. B. D. Blackwelder to be Director of the new full time county health unit. Dr. Blackwelder is at present full time health officer in Holmes County.

The Vicksburg Sanitarium and Crawford Street Hospital held its regular monthly staff meeting in Vicksburg on December 10. The following program was given:

1. Chronic Abscess of the Breast Simulating Carcinoma—Dr. G. M. Street.

2. Carcinoma of the Stomach—Sleeve Resection—Dr. A. Street.

3. Traumatic Aneurism of the Radial Artery —Dr. J. A. K. Birchett, Jr.

4. Cerebro-spinal Syphilis—Dr. L. J. Clark.

5. Memingococcus Cerebro-spinal Meningitis —Dr. H. H. Johnston.

6. Demonstration of Selected Radiographic Studies:

(1) Fracture of the hip.

(2) Calcium deposit in thyroid gland

(3) Sinuisitis.

(4) Aneurism of aorta.

(5) Pulmonary tuberculosis.

(6) Nephrolithiasis.

(7) Pyloric obstruction.

(8) Cholelithiasis.

(9) Duodenal ulcer.

OUR PREVENTORIUM

Within a few months Mississippi will have a beautiful preventorium for children at the Tuberculosis Sanatorium. To my mind this institution as a composite part of our great institution at Magee will do a far greater service as an educational factor of far reaching importance and in the ultimate control of tuberculosis in the State than any previous step taken.

The teaching of selected children from the various communities and homes of the State how to live and how to prevent a breakdown in later life, will go a long way toward the prevention and final stamping out of tuberculosis. Susceptible children properly trained or educated in tuberculosis control in a modern Preventorium and sent back into the various communities of the state will eventually react for more cooperative community work in hygienic matters, better and more strict enforcement of the anti-spitting laws, better and more strict regulations for handling milk, more careful medical observation of all individuals, a better and broader view of educational matters in public health, and finally a better and healthier citizenship.

Some of the reasons for this institutional care are:

1. Safeguarding the child from tuberculous parents or relatives—in this way preventing continuous infection.

2. Discipline in habits and modes of living, at an age which is most impressionable.

3. Making an asset to the community of an individual who would otherwise be a liability.

4. The child going home to his own community leads others into ways and requisites for better health.

5. These little ones will be saved from years of invalidism or perhaps death from tuberculosis and will not become just so many sources of the spread of infection.

Mississippi is making a tremendous effort along the lines of disease prevention and control. It is well to spend more money for the prevention and control of all communicable diseases and then eventually less and less money for the cure of diseases in state supported hospitals. Fifty years, which is after all much less than an average lifetime, from today very much smaller appropriations should be necessary for charity, insane and tuberculosis hospitals, feebleminded institutions, etc. Adequate public health programs properly supported and administered will do the job. These institutions for the treatment of disease only have been supported for all the years that are past and are becoming a greater necessary burden to the taxpayer every year. Reason it out for yourself. Get behind a real state-wide program of prevention of disease, begin at the source of our trouble and not spend all of our time and money on the curative end—work at both ends of the problem at the same time.

The conference of County Health Officers and Sanitary Inspectors was held in Jackson, Mississippi, on December 11-13, 1928. Their program was as follows:

1. Brewers' Yeast in Pellagra—Dr. A. K. Barrier, Rolling Fork.

2. Illegal Practitioners — Dr. J. C. Rush, Waynesboro.

3. Public Health Educational Campaign—Dr. F. Michael Smith, Vicksburg.

4. Venereal Disease Control—Dr. O. C. Wenger, Hot Springs, Ark.

5. Scarlet Fever—Dr. H. C. Ricks, Jackson.

6. Control of Diphtheria—Dr. T. W. Kemmerer, Jackson.

7. Round Table Discussion of Program for Part-Time County Health Officer—W. H. Anderson, Booneville.

8. Round Table Discussion of Medical Inspection of School Children—Dr. B. T. Tobinson, New Augusta.

9. Public Health Records—Dr. J. H. Janney, Indianola.

10. Vital Statistics in Kentucky—J. F. Blackerby, Louisville, Ky.

11. New Methods of the Bureau of Vital Statistics—Dr. R. N. Whitfield, Jackson.

12. Disease Causation and Prevention—Dr. C. C. Applewhite, Jackson.

13. Methods of Selling the Privy Idea to the Public—M. A. Crawford, Meridian.

14. Privy Construction—John B. Grant, Vicksburg.

15. Septic Tank Construction. Safe Water Supplies—H. A. Kroeze, Jackson.

16. Standard Milk Ordinance and Enforcement—H. A. Kroeze, Jackson.

17. O'Tolidin Test for Strength of Chlorine Solution, Demonstration of Methylene Blue Reductase Test—Dr. N. M. Parker, Jackson.

18. Standardization of Laboratory Procedure and Checking—Dr. T. W. Kemmerer, Jackson.

19. Interpretation of Milk Regulations—General discussion.

20. Municipal Inspections — Floyd Ratcliff, Jackson.

21. Mosquito Control — Nelson H. Rector, Clarksdale.

22. The Use of Maps, Charts and Graphs—George Parker, Jackson.

23. Ordinances—H. A. Kroeze, Jackson.

As reported elsewhere in these columns the address by Dr. A. T. McCormack, State Health Officer, Louisville, Kentucky, was delivered before the Issaquena-Sharkey-Warren Counties Medical Society which meeting was attended in a body by the conference.

CORRECTION

In the December issue of the Journal, Mississippi News, it is stated that 72 per cent of the white children in Laurel have gold teeth. This should read good.

CANCER NOW SECOND AS CAUSE OF DEATH.—Cancer and other malignant tumors jumped into second place as a cause of death in the United States in 1927. Deaths from cancer in that year, the Department of Commerce announced today, totaled 103,578, as compared with 99,833 in 1926.

The death rate from cancer in 1927 was 95.6 per 100,000 estimated population, compared with 94.9 per 100,000 in 1926. Cancer ranked second only to diseases of the heart as a death cause in 1927. In 1926 cancer ranked fourth, heart diseases being first, pneumonia second and nephritis third.

The total deaths in the United States in 1927 was 1,236,949 within the official death registration area, representing a death rate of 11.4 per 1,000 population—the lowest since 1900.

In 1926 there were 1,285,927 deaths in the registration area, a death rate of 12.2 per 1,000.

The registration area in 1927 comprised forty-two States, the District of Coumbia, and twenty-one cities in non-registration States, with an estimated population on July 1, 1927, of 108,327,000, or 91.3 per cent of the estimated population of the United States.

The principal decreases in death rates in 1927 were from pneumonia, all forms, from 103 to 81 per 100,000 population; influenza from 41 to 23; tuberculosis, all forms, from 87 to 81; diarrhea and enteritis (under two years) from 27 to 22; nephritis from 98 to 93; measles from 8 to 4, and diseases of the heart from 199 to 196.

The death rate from automobile accidents increased from 17.9 per 100,000 in 1926 to 19.5 per 100,000 in 1927. The number killed in automobile accidents, excluding collision with railroad trains and street cars, was 21,160, compared with 18,871 in 1926.

In addition, 1,676 were killed in automobile collisions with railroad trains in 1927, compared with 1,556 in 1926, and 476 were killed in automobile collisions with street cars in 1927, compared with 464 in 1926.

The suicide death in 1927 was 13.3 per 100,000 population, as compared with 12.8 in 1926. The number of suicides was 14,356 in 1927, as against 13,410 in 1926.

The number of homicides grew from 9,210 in 1926 to 9,470 in 1927, but the homicide death rate fell from 8.8 in 1926 to 8.7 per 100,000 in 1927.—The New York Times, December 21, 1928.

BOOK REVIEWS

Textbook of Fractures and Dislocations: By Kellogg Speed, S. B., M. D., F. A. C. S. 2d ed. Philadelphia, Lea & Febiger. 1928. pp. 952.

This volume is particularly valuable because of the care which the author exercises in his attention to minute details. He does not take for granted that the readers may already know certain things. In doing this the wide experience of Dr. Speed, both in the practice of the subject under consideration, and in teaching is everywhere manifest. Each chapter may well be considered a lecture on a particular subject.

There are certain points about which one might take issue with the author, but on the whole, this book may be considered one of the most valuable texts on the subject of fractures and dislocations, which has been published in recent years.

ISIDORE COHN, M. D.

The Treatment of Diabetes Mellitus: By Elliott P. Joslin, M. D., M. A. 4th ed., enl., and rewritten. Illustrated. Philadelphia, Lea & Febiger. 1928. pp. 998.

Dr. Joslin might very well adopt a paraphrase of the old motto, "Nothing of human interest is foreign to me," and declare "Nothing concerning diabetes is indifferent to me." His monograph is a veritable storehouse of information not only of facts concerning the clinical picture of diabetes but of the underlying perverted function and of the history of the development of modern conceptions concerning the disease. There is no question which might arise in the mind of the clinician or of the investigator in this domain concerning which they may not find in this book valuable and sound information and a guide to the sources. To one who has seen the development of the work from its first edition, the appearance of this new fourth edition is a source of solid satisfaction. It contains so much new material that it is in large measure a new work. Neither the practitioner nor the medical student should look upon it as intended chiefly or entirely for the specialist nor should they be frightened by the size of the book which has now reached approximately 1000 pages. Dr. Joslin's style has always made its reading easy and stimulating. Considering the importance of diabetes mellitus as a cause of illness and of death in the United States, no doctor can afford not to be thoroughly posted concerning it nor can the care of diabetes in general be referred to specialists. Joslin estimates there are 1,400,000 diabetics in the United States (over 1 per cent of the population). The death rates from diabetes per 100,000 population has risen from 2.8 per cent in 1880 to 9.7 per cent in 1900 to 14.9 per cent in 1910 and 16.9 per cent in 1925. Between 1880 and 1925 the percentage of diabetic deaths to total deaths rose tenfold to 1.43 per cent. In 1900 diabetes ranked twenty-seventh as a cause of death in the registration area of the United States but in 1920 it was twelfth.

There is probably in the whole field of medicine no chapter of more fascinating interest than that of diabetes. In no other field is the diagnosis, therapy and general management so soundly based upon scientific experimentation and definite almost mathematical laboratory demonstration. In no other field has the development of knowledge proceeded in such a logical, orderly and accurate manner. From the time of the demonstration in 1889 by von Mering and Minkowski of diabetes in dogs following pancreatectomy there has been a steady march of progress; no accidental discovery has been made but each step has depended upon the one before and has in its turn indicated its successor. Opie in 1901 and Ssobolew in 1902 showed that the islands described by Langerhans in 1869 were the elements of the gland involved in diabetes. Ssobolew discovered that ligation of the pancreatic duct produced atrophy of the acinous tissue only and not of the islands and no diabetes. Schafer in 1916 prophesied the discovery of the hypoethtical internal secretion of the Langerhans islands and proposed the name of insulin for it; finally the trail culminated in the isolation of insulin by Banting and Best in the laboratory of Professor Macleod at Toronto in 1921. Nor is the interest of the reader and student left satiated by this record of the past. Joslin indicates many points still not clear and open to controversy and further investigation. There is for example the question of the relation of diabetic coma to acidosis and the very practical question as to whether coma is best treated with or without alkalies. Joslin, as is well known, is much opposed to the use of soda on theoretical grounds as likely to produce alkalosis. The reviewer believes firmly that Joslin has demonstrated practically that the use of soda is not necessary. My experience in a series of coma cases exactly parallels his.

One may summarize the merits of Dr. Joslin's work by saying that it is not only a reference book for all questions concerning diabetes, not only a most interesting and authoritative work but also a practical and definite guide to the practitioner. It justly deserves a place on the shelves of his library and its pages should be well thumbed.

I. I. LEMANN, M. D.

Pocket Medical Dictionary: By George M. Gould, A. M., M. D. 9th ed. rev. Philadelphia, P. Blakiston Son & Co. 1928. pp. 922.

This revision of Dr. Gould's well-known pocket dictionary contains pronunciation and definition of the principal words used in medicine and its related sciences. There are complete tables of the arteries, muscles, nerves, bacteria, bacilli, micrococci, spirilla and thermometric scales and a revised dose list of drugs and their incompatibilities, in the English and metric systems of weights and measures, based upon the tenth revision of the U. S. pharmacopœia, and a revised veterinary dose table.

In these days of changing and voluminous nomenclature, an up-to-date dictionary is an essential part of the well-informed physicians armamentarium.

M. L. MARSHALL.

Syphilis: By Henry H. Hazen, A. M., M. D. Illus. St. Louis, C. V. Mosby Company. 1928. pp. 643.

Dr. Hazen has presented in one volume information of inestimable value. It is hardly conceivable to think that so large a subject as syphilis could be covered in so thorough a manner as Dr. Hazen and his collaborators have succeeded in doing in this single book. The anatomical structures are described individually in a most thorough manner with differential diagnoses and a complete bibliography with each chapter so that the reader may refer to the original articles cited.

The illustrations are numerous and very good, of particular interest to the urologist is the chapter by Dr. H. A. Fowler on the Genito-Urinary System.

MONROE WOLF, M. D.

Modern Medicine: By Sir William Osler, Bart., M. D., F. R. S., re-edited by Thomas McCrae, M. D., assisted by Elmer Funk, M. D. Philadelphia, Lea & Febiger. 1928. pp. 964.

This volume is the sixth in number of Osler's Modern Medicine and deals exclusively with diseases of the nervous system and diseases and abnormalities of the mind. The collaborators are the representative men in the field of neuropsychiatry in America and abroad. This third revised edition can be used as a *tole et lege* type of collateral reading for the general medical man whose spare time is limited, and as an adjunct to the book shelf of the neuropsychiatrist. It is thoroughly and correctly written.

The chapter on acute encephalitis and brain abscess, by the late E. E. Southard, M. D., revised by J. Ramsay Hunt, M. D., and likewise the chapter following by J. Ramsay Hunt, M. D., covers the detailed matter throughout using the scheme term of encephalopathy covering encephalitis and its vagaries. The paragraph therein on influenzal encephalitis and likewise the following chapter throughout should be instructive to the present day physician, inasmuch as many of our cases of encephalitis *cum et sine lethargica* can be traced to a so-called attack of influenza at a past period.

A meagre forty-three pages is given to the diseases and abnormalities of the mind, not sufficiently abstracted for the general practitioner. In these pages, while well written, the subject matter therein is pruned to a rhetorical minimum. A series of case histories incorporated under each abnormality would convey more rapidly to the reader a description leading to a more conclusive opinion.

WALTER J. OTIS, M. D.

Modern Medicine, Its Theory and Practice: Ed. by Sir William Osler, Bart., M. D., F. R. S. 3d ed., thoroughly rev. Re-ed. by Thomas McCrane, M. D., assisted by Elmer H. Funk, M. D. General index volume. Philadelphia, Lea & Febiger, 1928. pp. 126.

An analytic index, such as the volume herewith presented is an essential element to any reader gain the desired information with speed and facility. The publication of an adequate index makes of this system, a reference work of prime importance to every physician.

M. L. MARSHALL.

Diseases of the Ear, Nose and Throat: By Wendell Christopher Phillips, M. D. 7th ed. Philadelphia, F. A. Davis Co. 1928. pp. 922.

This book by an ex-president of the American Medical Association is an excellent revision of the former text by this author. An illustration of the confidence the volume enjoys among the profession is its widespread adoption as a text in medical schools.

A little more than half of the book is devoted to the ear, and completely covers the field of otology. A new chapter, "The Hearing Problem," is timely in surveying this important and much neglected subject. Recent advances in the treatment of infantile mastoiditis are described. Obsolete clinical and operative procedure are eliminated. The diseases of the nose and accessory sinuses are well covered. Variations in technique of submucous resection are described. In radical operation for chronic frontal sinusitis the author favors the Killian operation.

The laryngeal section is noteworthy. The operation of laryngectomy featuring the procedure of McKenty is particularly good. The technique of suspension laryngoscopy as used by Lynch of New Orleans is well described and it is to Lynch that the author gives credit for the perfected suspension instrument of today.

The technique of bronchoscopy and esophagoscopy is given according to the methods used by Jackson and his staff at the Chevalier Jackson bronchoscopic clinic in Philadelphia. Reproductions of some of the paintings by Chevalier Jackson illustrating bronchoscopic views of pathology are used. Various bronchoscopic instruments devised by Tucker, Clerf, Mosher, Lukens and Moore are described.

In the description of tracheotomy the author says: "The high tracheotomy operation is preferable to the tracheotomie inférieur of Trousseau, the hemorrhage in the former being much less." Most laryngologists prefer low tracheotomy as less likely to lead to laryngeal stenosis. Jackson advises that the treacheotomic incision be made below the second ring of the trachea.

The book is well written, well illustrated and remarkably free from typographical errors.

H. KEARNEY, M. D.

Ultra-Violet Rays in the Treatment and Cure of Disease: By Percy Hall, M. R. C. S. (Eng,), L. R. C. P. (Lond.). 3d ed. St. Louis, C. V. Mosby Co. 1928. pp. 230.

This book contains twenty-six chapters of interesting reading matter and there are sixty-four illustrations, the greater number being utilized to illustrate physio-therapy apparatus.

The author's method of applying the ultra-violet rays in disease conditions is fully explained, employing only the most modern methods of application.

This book is recommended to all physicians interested in physio-therapy.

LEON J. MENVILLE, M. D.

Recent Advances in Physiology: By C. Lovatt, Evans, D. S. C. (Lond.), M. R. C. S., L. R. C. F., F. R. S. 3d Ed. Philadelphia, P. Blakiston's Son and Company. 1928. 397 pp.

This is one of the valuable series of "Recent Advances" which includes similar works on Anatomy, Biochemistry, Medicine, Surgery, etc. This volume will be found particularly interesting in connection with the one on Biochemistry with which it has numerous points of contact.

This book may be called an Elementary Text-Book of Advanced Physiology. Its aim is to present to the student who has worked through an ordinary text-book an account of some of the problems with which physiologists have been concerned during recent years, and thus to serve, not only to enrich the student's knowledge as regards subjects of contemporary interest, but also to form a convenient bridge by which he may, if he feels so disposed, pass more readily into the original literature of those subjects. Not only the student of Physiology, however, but the Physiologist and the Internist will feel repaid for studying the account of some of the branches of Physiology in which recent advances are being made.

Two new chapters—on "Excitability and Chronaxia" and "The Nervous Impulse"—have been added to this edition. In order to make room for them, three chapters have been omitted from among those of the second edition. All the remaining chapters have been considerably revised. The three chapters omitted dealt with Blood Corpuscles, Blood Plasma, Suspension Stability of the Blood and the Evidence of Blood Destruction. Even with the addition of the new material, the size of the book has been increased by only 40 pages.

A list of some of the subjects treated, indicates the particular appeal of this work, Tissue Oxidations; The Application to the Physiology of Muscular Exercise in Man of the Results of Researches on the Chemistry and Physics of Contraction; Conditioned Reflexes, prepared with the direct help of Dr. G. V. Anrep, a pupil of Pavlov; Thyroxin, Pituitary Principle, Insulin, Parathyroid; The Carriage of Carbon Dioxide by the Blood; Blood Reaction, including a Discussion of Buffers, the H- electrode, the Indicator Method; Capillary Circulation.

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